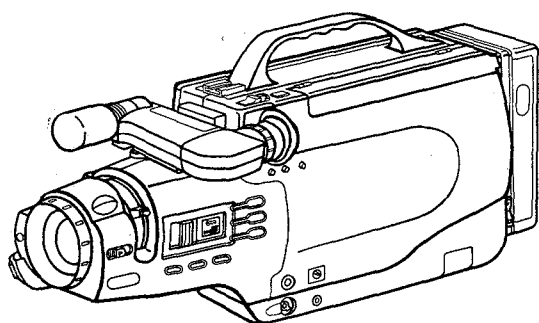


SHARP SERVICE MANUAL



VHS CAMCORDER

HQ HIGH QUALITY

MODEL VL-L330U

In the interests of user-safety (Required by safety regulations in some countries) the set should be restored to its original condition and only parts identical to those specified should be used.

CONTENTS

• IMPORTANT SERVICE NOTES	2
• ADJUSTMENT OF VCR MECHANISM UNIT	3
• FEATURES	7
• SPECIFICATIONS	7
• MAJOR OPERATING COMPONENTS AND THEIR FUNCTIONS	8
• DISASSEMBLY AND REASSEMBLY	10
• TROUBLESHOOTING	12
• ADJUSTMENT, REPLACEMENT, ASSEMBLY AND CLEANING OF MECHANICAL UNITS	22
• ADJUSTMENT OF ELECTRICAL CIRCUIT	43
• SCHEMATIC DIAGRAM, PWB BOARD etc	69
• REPLACEMENT PARTS LIST	113
• PACKING OF THE SET	146
• AC ADAPTOR	147

SHARP ELECTRONICS CORPORATION

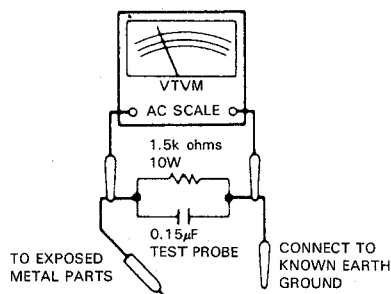
Service Headquarters: Sharp Plaza, Mahwah, New Jersey 07430-2135 Phone (201) 512-0055

IMPORTANT SERVICE NOTES

BEFORE RETURNING THE VHS camcorder

Before returning the VHS camcorder to the user, perform the following safety checks.

1. Inspect all lead dress to make certain that leads are not pinched or that hardware is not lodged between the chassis and other metal parts in the VHS camcorder.
2. Inspect all protective devices such as non metallic control knobs, insulating materials, cabinet backs, adjustment and compartment covers or shields, isolation resistor / capacitor networks, mechanical insulators etc.
3. To be sure that no shock hazard exists, check for leakage current in the following manner.
 - Plug the AC line cord directly into a 120 volt AC outlet (Do not use an isolation transformer for this test).



- Using two clip leads, connect a 1.5k ohm, 10 watt resistor paralleled by a 0.15µF capacitor in series with all exposed metal cabinet parts and a known ground, such as a water pipe or conduit.
- Use a VTVM or VOM with 1000 ohms per volt., or higher sensitivity to measure the AC voltage drop across the resistor. (See Diagram.)
- Move the resistor connection to all exposed metal parts having a return path to the chassis (antenna connections, metal cabinet, screw heads, knobs and control shafts, etc.) and measure the AC voltage drop across the resistor. Reverse the AC plug (a non polarized adaptor plug must be used but only for the purpose of completing these checks) on the set and repeat the AC voltage measurements for each exposed metallic part. Any reading of 0.45V rms (this corresponds to 0.3mA rms AC.) or more is excessive and indicates a potential shock hazard which must be corrected before returning the VHS camcorder to the user.

WARNING: TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPLIANCE TO WET LOCATIONS.



CAUTION

**RISK OF ELECTRIC SHOCK
DO NOT OPEN**



CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER. NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.



This symbol warns the user of uninsulated voltage within the unit that can cause dangerous electric shocks.

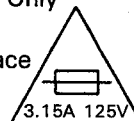


This symbol alerts the user that there are important operating and maintenance instructions in the literature accompanying this unit.

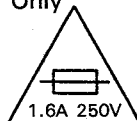
CAUTION

This symbol mark means following.
For continued protection against fire hazard replace only with same type fuse.

Camcorder
Only

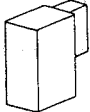
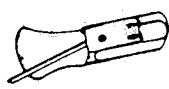
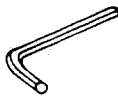
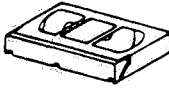
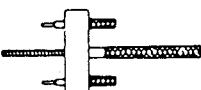
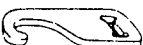


AC Adaptor
Only

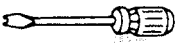
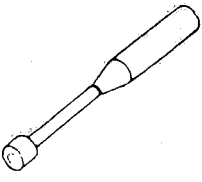


Adjustment of VCR Mechanism Unit

Note: N indicates the new jigs.

No.	Jig Item	Part No.	Code	Configuration	Note
1	Reel Disk Height Adjusting jig	JiGRH0002	BR		
2	Master Plane Jig-A	JiGMP0001	BY		
3	A/C Head Tilt, Retaining Guide Height Adjusting jig	JiGACH-L170U	BZ		
4	Torque Gauge 90g	JiGTG0090	CM		
	Torque Gauge 1.2 kg (JiGTG1200)	VCRT00L-8	CN		
5	Gauge Head (JiGTH0006)	VCRT00L-7	AW		
6	Cassette Torque Meter	JiGVHT-063	CZ		
7	Tension Gauge (300g) (JiGSG0300)	VCRT00L-10	BF		
	Tension Gauge (2.0kg) (JiGTG2000)	VCRT00L-11	BS		
8	Hex Wrench (0.9mm) (JiGHW0009)	VCRT00L-12	AE		
	Hex Wrench (1.2mm) (JiGHW0012)	VCRT00L-13	AE		
	Hex Wrench (1.5mm) (JiGHW0015)	VCRT00L-14	AE		
9	Alignment Tape (NTSC SP) (VROATSV)	VCRT00L-16	CD		
	Alignment Tape	VROLBZGS	CB		
	Alignment Tape	VRONBZGS	CB		
10	Drum Replacing Jig	JiGDT-0001	BG		
11	Tension Gauge Adapter	JiGADP003	BK		

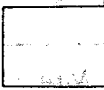
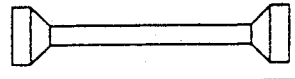
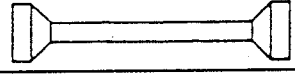
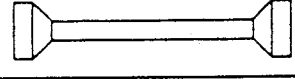
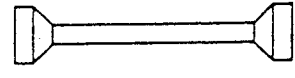
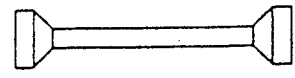
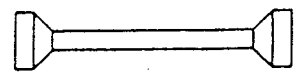
Note: N indicates the new jigs.

No.	Jig Item	Part No.	Code	Configuration	Note
12	Special Bladed Screwdriver	JiGDRIVERH-4	AP		
13	Tension Band and Plate Adjusting Jig 5	JiGDRIVER-6	BM		
14	Torque Driver	JiGTD1200	CB		
15	Box Driver	JiGDRIVER110-7	AS		
		JiGDRIVER110-4	AV		
16	Master Plane Jig-B	JiGMP-L170U	CF		
17	Reverse Guide Height Adjusting Jig	JiGRVGH-L170U	CC		
18	Tape Tension Gauge	—	—		

Note: Current JiGMA0001 contains master plane (JiGMP0001) and Disk height adjusting Jig (JiGRH0001). Even though New Disk adjusting (JiGRH0002) covers wider height, this new Jig (JiGRH0002) can be used for current JiGRH0001, however current Jig (JiGRH0001) cannot be used as JiGRH0002. Master plane (JiGMP0001) can be used with JiGRH0001, and also JiGRH0002.

Adjustment of Camera Unit

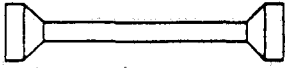
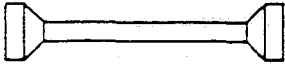
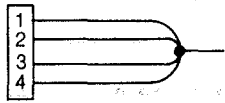
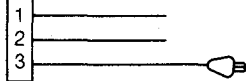
Note: N indicates the new jigs.

No.	Jig Item	Parts Code	Price Code	Configuration	Note
1	Camera Stand	JIGSTAND-L310	BK		
2	Gray Scale Chart (390 x 520mm)	JIGCHART-1	CP		
3	White Pattern Chart (390 x 520mm)	JIGCHART-2	CG		
4	Color Bar Chart (240 x 520mm)	JIGCHART-4	**		
5	Tracking Driver	JIGDRIVER-11	BR		
6	Solder (For chip parts service)	JIGHANDA-S256	BP		
7	Illuminometer (0~3000Lux)	JIGMETER-1	CT		
8	Color Thermometer (1600~400000°K)	JIGMETER-2	**		
9	Color Temperature Conversion Filter	JIGHOYA-LB165	BH		
10	Siemens Star Chart (Master Lens Adjustment Chart)	JIGCHART-11	CE		
11	Extension Wire (Connected to MD(P704) ↔ FD(P706) connector)	QCNW-1090TAZZ	BG		
12	Extension Wire (Connected to MC(P703) ↔ FC(P705) connector)	QCNW-1091TAZZ	BF		
13	Extension Wire (Connected to FE(P601) ↔ Lens)	QCNW-1092TAZZ	BF		
14	Extension Wire (Connected to ME(P701) ↔ AN(P14) connector)	QCNW-1093TAZZ	AM		
15	Extension Wire (Connected to FB(P709) ↔ AP(P10) connector)	QCNW-1094TAZZ	AM		
16	Extension Wire (Connected to MF(P401) ↔ AM(P13) connector)	QCNW-1095TAZZ	AP		
17	Extension Wire (Connected to FA(S701) ↔ CA(S001) connector)	QCNW-1096TAZZ	AH		

Note: 1. Color temperature conversion filter (jig item No. 9) may be obtained from HOYA Optics in your local market.

Adjustment of VCR Unit

Note: N indicates the new jigs

No.	Jig Item	Parts Code	Price Code	Configuration	Note
1	Extension Wire (AG(S7) ↔ MG(P702)) (AE(S5) ↔ MC(P703)) Main PWB ↔ Mecha Unit	QCNW-1000TAZZ	AM	 FFC 7Pin	
2	Extension Wire (AI(P9) ↔ Start Sensor) Main PWB ↔ Mecha Unit	QCNW-1001TAZZ	AP	 4Pin	
3	Extension Wire (AH(P8) ↔ End Sensor) Main PWB ↔ Mecha Unit	QCNW-1003TAZZ	AN	 2Pin	
4	Adjustment Jig (AW(P20)) Main PWB	QCNW-1100TAZZ	AN	 4Pin	
5	Adjustment Jig (AU(P50)) Main PWB	QCNW-1101TAZZ	AP	 3Pin	

FEATURES

1. 1/2" CCD image sensor with F1.6, JETZOOM 12x variable speed zoom
2. CAT'S EYE—Minimum illumination 1 lux
3. Fine video editing with Flying Erase head and Audio Dubbing
4. Full Auto system
5. 1/10000, 1/2000, 1/500, 1/100 sec, High Speed Electronic Shutter for blur-free still images
6. HQ (High Quality) picture
7. Self timer for Camera Recording
8. Interval recording for time lapse photography
9. Use of "standard" VHS Video cassettes
10. Warning Indications – Battery, Low Light, Tape-end, etc.
11. 3-way power source with AC, battery, and car battery
12. Stable picture with less jitter using a 62 mm cylinder

SPECIFICATIONS

Signal System:	NTSC – type color and monochrome signals
Recording System:	VHS Standard
Tape Width:	12.7mm (1/2inch)
Maximum Recording/Playback Time:	160min. (With T – 160 tape)
Tape Speed:	33.35mm/sec.
Pickup Device:	CCD Image Sensor (approx. 270,000 pixels including optical black.)
Lens:	F1.6, f = 8~64mm/F2.4, f = 12~96mm power zoom, auto focus with macro function
Lens filter diameter:	46mm
Viewfinder:	0.6inch B/W CRT with diopter
Microphone:	Omni-directional electret condenser
Color Temperature Compensation:	Auto white balance white balance lock.
Minimum Illumination:	1 lux (with Gain up)
Video Output Level:	1.0 Vp-p composite, 75 ohm
Audio Output Level:	308mV, less than 600 ohms
Mic. Input Level:	– 62.8 dBs, 18k ohm (use a high impedance mic with 3.5mm plug)
Power Requirement:	DC 12V
Power Consumption:	12W
Dimensions (approx.):	5 1/2" (W) x 9 1/6" (H) x 15 5/32" (D) (140(W) x 232(H) x 385(D)mm)
Weight (approx.):	5.5 lbs (2.5kg)

specifications are subject to change without notice.

AC Adaptor / Battery charger

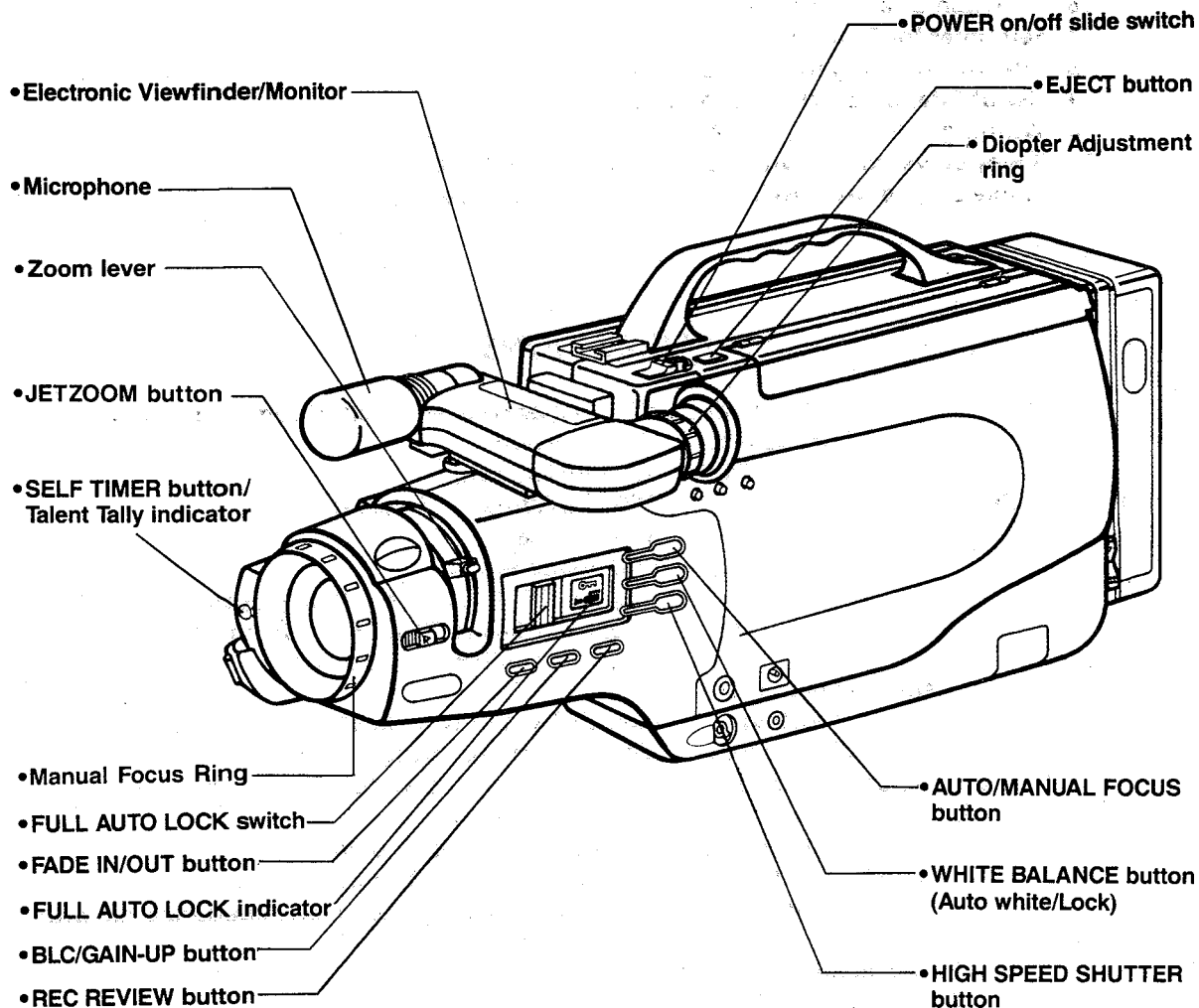
Power Requirement:	AC 100~240V, 50/60Hz
DC Output:	DC 13V, 1.4A
Power Consumption:	30W
Dimensions (approx.):	3 1/16" (W) x 12 7/32" (H) x 7 1/4" (D) [78(W) x 47(H) x 184(D)mm]
Weight (approx.):	0.99 lbs (450 g)

Battery pack BT-22

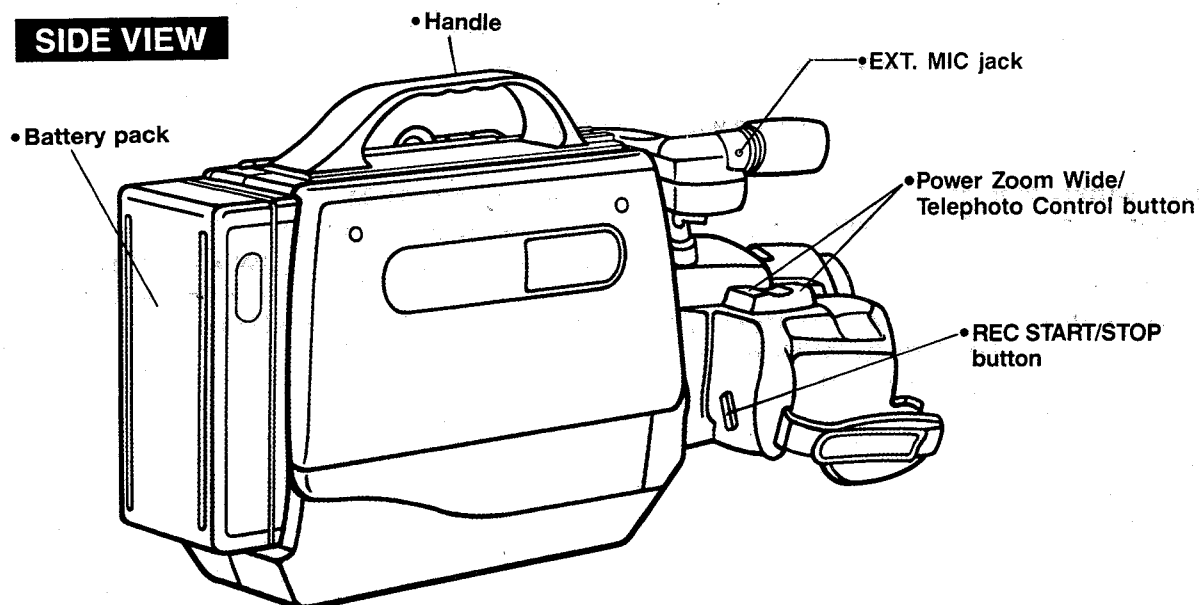
DC Output:	DC12V
Dimensions:	2 29/32" (W) x 6 1/4" (H) x 11 1/32" (D) [74(W) x 159(H) x 34(D)mm]
Weight:	1.6 lbs (715 g)

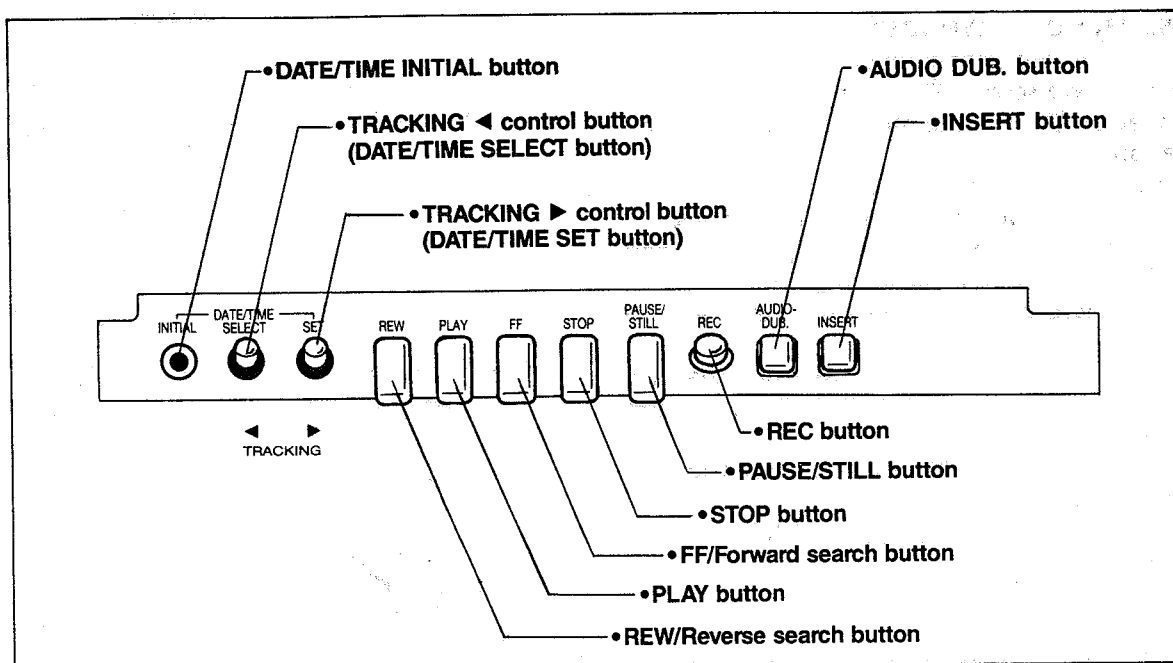
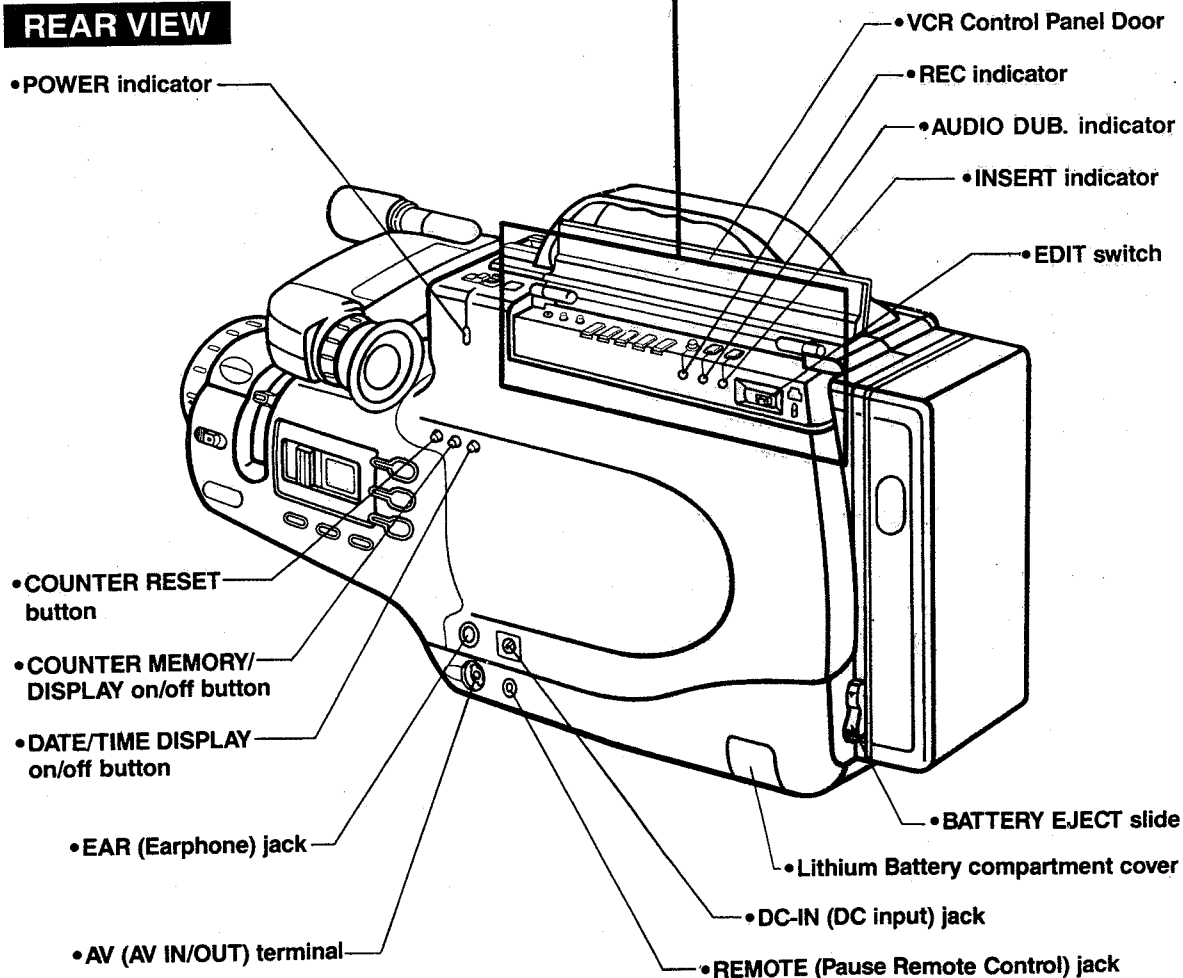
MAJOR OPERATING COMPONENTS AND THEIR FUNCTIONS

FRONT VIEW



SIDE VIEW



CONTROL PANEL**REAR VIEW**

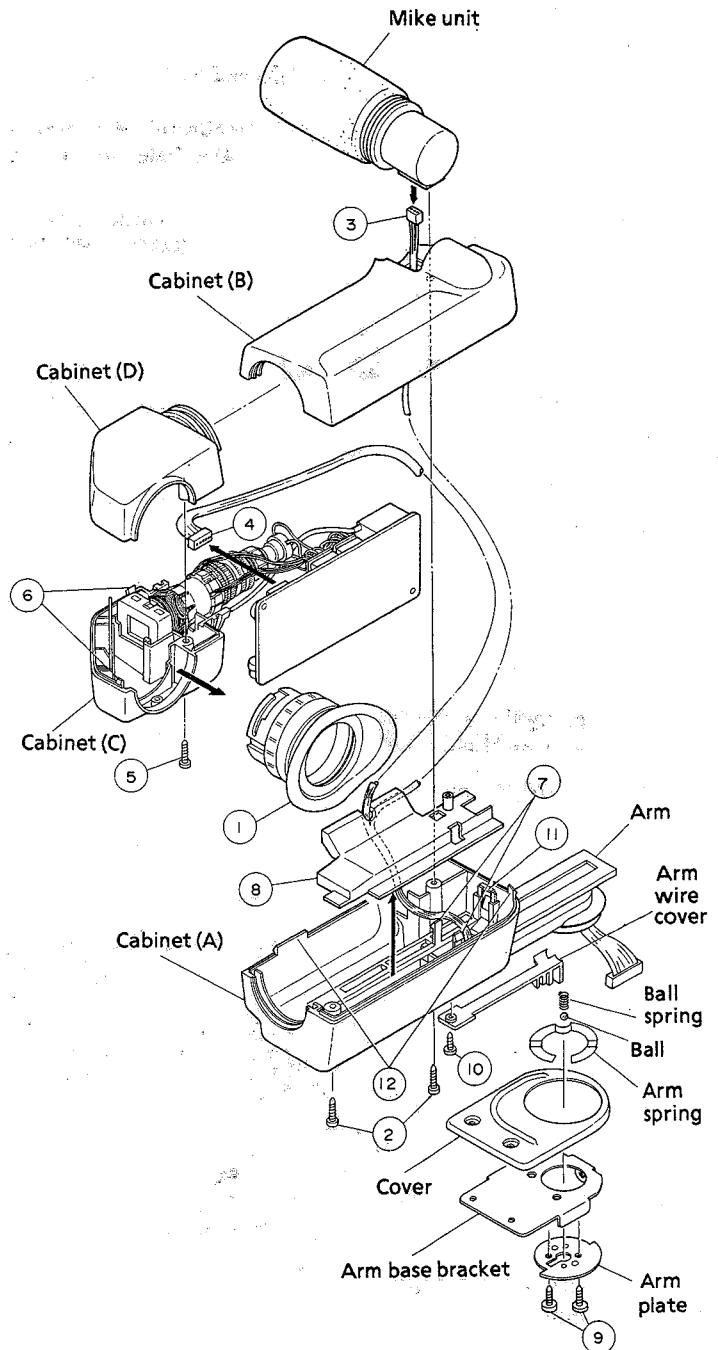
DISASSEMBLY AND REASSEMBLY

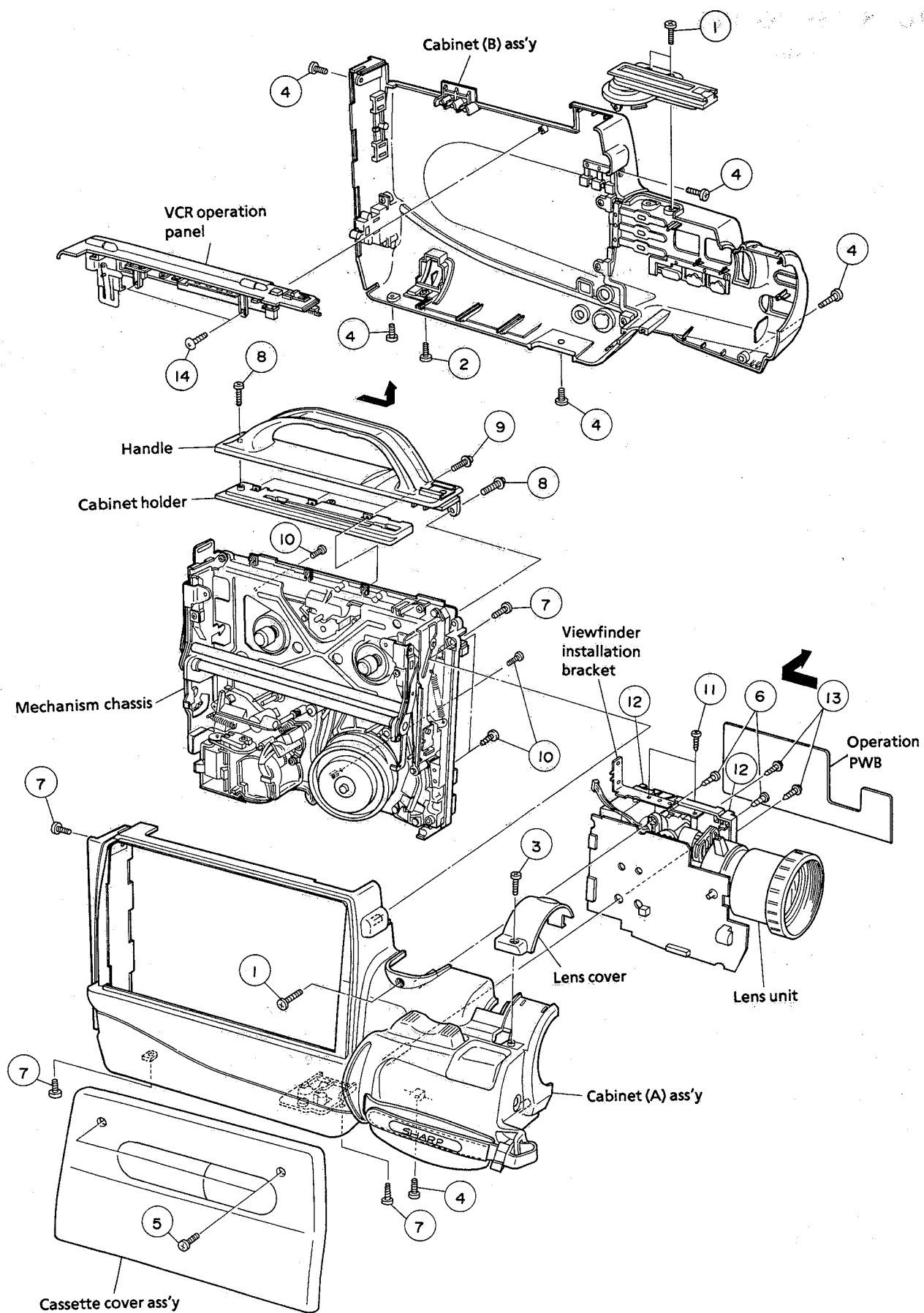
DISASSEMBLY OF VIEWFINDER

1. Remove the viewfinder lens unit ①.
2. Remove two screws ②, two pawls ⑫ and the connector ③ from the mike unit, and take out the cabinet (B).
3. Remove one connector ④ and take out the CRT assembly and cabinet (C) and (D) assemblies.
4. Remove one screw ⑤ and two pawls ⑥ and take out the cabinets (C) and (D).
5. Remove two pawls ⑦ and take out the wire cover ⑧.
6. Remove two screws ⑨ and take out the arm plate, arm base bracket, ball, ball spring, arm spring, and cover.
7. Remove one screw ⑩ and take out the arm wire cover.
8. Remove stopper spring ⑪ and take out the arm.

DISASSEMBLY OF CABINET

1. Remove three screws ① and the connector and take out the viewfinder.
2. Remove one screw ② and the lithium battery cover.
3. Remove one screw ③ and the lens cover.
4. Remove six screws ④ and the cabinet (B) assembly.
5. Remove two screws ⑤ and the cassette cover assembly.
6. Remove two screws ⑥ and the lens unit.
7. Remove four screws ⑦ and the mechanism chassis.
8. Remove two screws ⑧ and the handle by sliding it in the direction of the arrow.
9. Remove three screws ⑨ and the cabinet holder.
10. Remove four screws ⑩ and the VCR unit.
11. Remove two screws ⑪ and the viewfinder installation bracket.
12. Remove two hooks ⑫ and the camera operation PWB.
13. Remove two screws ⑬ and the PWB holder by sliding it in the direction of the arrow.
14. Remove two screws ⑭ and the VCR operation panel.





TROUBLESHOOTING

1) Camera Section

No.	Symptoms	Possible causes
1	No picture. (Picture does not appear if iris is manually opened.)	1) Voltage at each pin of P709 (A/F board) is abnormal. → Power source unit and connection are defective. 2) Y signal at P401 (process board Y-OUT) is normal. → Connection is defective and VCR EE circuit is defective. 3) YH signal at Q418 (process board) emitter is normal. → IC401 (process board) and peripheral circuits are defective.* 4) YH signal at Q403 (process board) emitter is normal. → FL401, Q418 and peripheral circuits are defective. 5) Y1H signal at Q213 (process board) emitter is normal. → Defect is caused between pins ③ and ④ of IC201. Soldering of C216 is defective. 6) Y signal at Q211 (process board) emitter is normal. → IC203, Q212, FL203 and peripheral circuits are defective. 7) Y signal at Q205 (process board) emitter is normal. → Q206, Q207, Q208, Q209, Q211 and peripheral circuits are defective. 8) Y signal at pin ②⑧ of IC201 (process board) is normal. → FL201, FL202, Q205, Q206 and peripheral circuits are defective. 9) CDS signal at pin ②④ of IC201 (process board) is normal. → IC201 and peripheral circuits are defective. 10) CDS signal at pin ② of sensor board FPC cable (check land) is normal. → Connection of flexible wire and connector is defective. 11) Source wave form at Q107 (sensor board) is normal. → IC104, Q105, Q106 and peripheral circuits are defective. 12) Voltage and wave form at each terminal of CCD sensor are normal. → CCD sensor is defective. 13) 4fsc signal at pin ⑧ of sensor board FPC cable (check land) is normal. → IC102, IC103, IC105, IC106 and peripheral circuits are defective. 14) 4fsc signal at pin ⑧ of sensor board FPC cable (check land) is abnormal. → IC101 or X101 is defective. * When checking IC401, if C-Sync is not normally applied to pin ②⑥ of IC401, check 4fsc signal. If 4fsc signal is normal, IC501 or peripheral circuits are defective.
2	No color. Color appears, but it is not normal.	1) C signal at P401 (process board) is normal. → Connection and VCR EE circuit are defective. 2) C signal at pin ④⑦ of IC401 (process board) is normal. → Q401, D401 and peripheral circuits are defective. 3) SC signal at pins ③⑨ and ④⑩ of IC401 (process board) is abnormal. → IC501 and peripheral circuits are defective.

No.	Symptoms	Possible causes
2		4) Color-difference signal at pins ① and ② of Q416 (process board) is normal. → Soldering of C412 and C413 are defective or IC401 and peripheral circuits are defective. 5) Color-difference signal at pins ⑮ and ⑫ of IC201 (process board) is normal. → IC201 and peripheral circuits are defective. 6) Color-difference line sequential signal at pins ⑰ and ⑱ of IC201 (process board) is normal. → IC201 and peripheral circuits are defective. 7) C-AGC signal at pin ⑳ of IC201 (process board) is normal. → Color-difference line sequential coincidence circuit, CNR circuit and peripheral circuits are defective. 8) Color-difference line sequential signal at pin ㉑ of IC201 (process board) is normal. → IC201 and peripheral circuits are defective. 9) Color-differential line sequential signal at pin ㉒ of IC201 (process board) is normal. → Q216, Q217 and peripheral circuits are defective. 10) CDS signal at pin ㉓ of IC201 (process board) is normal. → IC201 and peripheral circuits are defective.
3	High speed shutter does not operate.	1) Transmission signal does not appear at pins ③, ④ and ⑤ of S202 (process board). → P701 (process board) connector is not connected well or VCR side circuits are defective. 2) Transmission signal at P701 (process board) is normal. → IC655 and peripheral circuits are defective. 3) Transmission signal does not appear at pins ㉓, ㉔ and ㉕ of IC101 (sensor board). → Connection of MB flexible pin ⑭ connector is defective. 4) Input voltage at pins ㉓, ㉔ and ㉕ of IC101 (sensor board) is normal. → IC101 is defective.
4	Iris does not open.	1) Output signal at pin ㉖ of IC201 (process board) is abnormal. → Peripheral circuits of IC201 are defective. 2) Wave form at pin ⑦ of IC802 (process board) is abnormal. → IC802, Q803 and peripheral circuits are defective. 3) Voltage at each pin of P901 (process board) is abnormal. → Q806, Q808, IC803 and peripheral circuits are defective. 4) Voltage at each pin of P901 (process board) is normal. → Connection is defective or lens unit is defective. Voltage when P901 is normal. Pin ①: approx. 1.7V Pin ②: approx. 1.7V Pin ③: approx. 8.4V Pin ④: approx. 2 to 8V when light enters after lens is uncapped.

No.	Symptoms	Possible causes
5	Power zoom does not operate.	1) Voltage at pin ③ of P606 (A/F board) is abnormal. → Zoom SW or connection is defective. 2) Voltage between pins ① and ② of P601 (A/F board) is abnormal. → IC001 and peripheral circuit are defective. 3) Voltage between pins ⑩ and ⑪ of P601 (A/F board) is normal. → Connection is defective or lens unit is defective.
6	No alignment of W/B.	1) Voltage at pins ⑫ and ⑬ of IC301 (process board) does not become Vref (approx. 1.7V). → Connection is defective, or peripheral circuits are defective. 2) Color-difference signal at pins ④ and ⑤ of IC301 (process board) is normal. → IC301, IC302 and peripheral circuits are defective.
7	Auto focus does not operate. (in auto focus mode).	1) Voltage at each pin of P601 (A/F board) is normal. → Connection is defective or lens unit is defective.
8	Only white picture appears.	1) FADE CTL signal at pin ⑥ of P701 (process board) does not become "H". → Connection is defective or VCR side circuits are defective. 2) Voltage at pin ⑦ of IC401 (process board) does not become approx. 2.5V. → Q404 and peripheral circuits are defective.

List of Ref. No. used for each board

Name	Ref. No.
Sensor board	101 ~ 199
Process board	201 ~ 499, 501 ~ 599
Process board	801 ~ 899, 601 ~ 699, 701 ~ 799
A/F board	001 ~ 099, 901 ~ 999

2) Viewfinder

No.	Symptom	Possible causes
1	No V/F picture.	1) V/F power voltage not supplied (check pin ② of P701) 2) V/F video signal not supplied (check pin ③ of P701) 3) IC701 defective (check output of pins ①⑥, ①③ and ③) 4) Brightness control maladjusted (check R722) 5) T701 flyback transformer defective 6) D704 diode defective 7) D705 diode defective 8) Q702 transistor defective 9) V701 CRT defective 10) L702 linearity coil defective 11) CRT socket in poor contact
2	Out-of-sync	1) R708 maladjusted
3	No character displayed	1) IC701 defective (check pin ⑧ of VD output) 2) Ditto (check pin ①⑥ of HD output)
4	Vertical size and image distortion	1) Check L702 for foreign matter deposits, etc. 2) Deflection yoke defective 3) C714 defective
5	Out-of-focus	1) Foreign matter deposits on V701 2) V/F voltage out of spec ($5.23 \pm 0.1V$ to be at pin ② of P701) 3) Focus maladjusted
6	Vertical size improper	1) R713 maladjusted

3) Y/C Circuit

No.	Symptom	Possible causes
1	No EE picture	1) No video signal at pin ④ of IC201 → Check control signal at pin ⑨ of IC201. 2) No signal at pin ④⑩ of IC203 → Check control signal, voltage, synchronizing signal at pins ④⑥, ②, and ⑤ of IC203, respectively. 3) No signal in TP203 → Check control signal at pin ①⑦ of IC202
2	No chroma signal	1) No chroma signal at pin ②⑧ of IC202 → Check circuits around IC201 and Q501. 2) No signal in TP203 → Check REC shade at pin ②③ of IC202. 3) No chroma signal in V/F → Check V/F shade at pin ①⑨ of IC202.
3	Video signal recording impossible	1) No video signal in TP208. → Check C236. 2) No FM signal in TP207 → Check circuits around IC203. 3) No FM signal at pin ①⑤ of IC301 → Check R312. 4) No FM signal in TP301 → Check circuits around IC301, voltage at pin ①⑥ of IC301, and C324.
4	Chroma signal recording impossible	(AV input mode) 1) No video signal at pin ① of IC202 → Check circuits around IC203 and control signal of Q203 base. 2) No chroma signal at pin ①④ of IC203 → Check IC203, FL501 and DL501. 3) No chroma signal at pin ②② of IC203 → Check circuits around IC203. 4) No chroma signal at pin ①④ of IC301 → Check R313 and C310.
5	No playback video signal	1) No FM signal at pin ②⑩ of IC301 → Check circuits around IC301 and voltage at pin ①⑦. 2) No FM signal at pin ⑥⑥ of IC203 → Check Q401, Q402 and Q403. 3) No video signal at TP208 → Check voltage at pins ④⑥ and ⑥② of IC203. 4) No video signal at TP203 → Check circuits around IC202.
6	No playback chroma signal	1) No FM signal at pin ②② of IC301 → Ditto in 1) of 5. 2) No chroma signal at pin ①⑥ of IC203 → Check Q404 and Q405. 3) No chroma signal at pin ③ of IC202 → Check control signals at pin ④⑥ of IC203 and in Q203. 4) No chroma signal at pin ②⑩ of IC203 → Check circuits around FL501, DL501 and IC203.

4) Audio Circuit

No.	Symptoms	Possible causes
1	No audio output at playback	1) Defective audio head 2) Is playback audio signal fed to pin ②④ of IC602?
2	Distorted audio output	1) Magnetization or breakdown of audio head 2) Improper bias current
3	Poor sensitivity in recording and playback	1) Magnetization or failure of audio head 2) Defective bias oscillating circuit
4	Recording impossible	1) Bias oscillating circuit inoperative
5	Excessive hum and noise	1) Defective audio head
6	No signal from microphone	1) Open circuit in microphone line in main body V/F cable
7	Sound recording impossible through AV IN/OUT socket	1) Is signal from AV IN/OUT socket delivered to pin ①⑨ of IC602?

5) Servo Unit

No.	Symptoms	Possible causes
1	Tape runs out of control in playback or record mode.	1) CAP FG signal is not inputted to pin ①① of IC701. → Check CAP FG signal at pin ①① of IC701. 2) CAP Lock is offset. → Check pulse duty at pin ①⑨ of IC701
2	Tape does not run in playback or record mode.	1) CAP LOCK signal is offset. → Check pulse duty at pin ①⑨ of IC701.
3	Periodic noise appears on replayed picture or picture flows in vertical direction.	1) CAP LOCK signal is unlatched. → Check pulse duty at pin ①⑨ of IC701. 2) Is playback control signal outputted? → Check at pin ④② TP702) of IC701.
4	Picture flows in horizontal direction.	1) Is DRUM FG signal outputted? → Check at pin ⑥ of IC701. 2) Is DRUM PG signal normal? → Check at pin ④ of IC701.
5	Neither drum nor capstan rotates in playback or record mode.	1) Is 3.58MHz reference signal inputted? → Check at pin ②② of IC701.

6) Indication of Malfunction

No.	Indications	Possible Causes	Checkpoints	Normal Waveform and Voltage
1.	E007	At Pin ⑥ of IC801 Cap FG absent during REC REVIEW and EDITING	Pin ⑥ of IC801	 DC5V
2.	E011	No mode shift after loading motor turns in loading direction for 5 seconds.	Pins ⑤⑨ and ⑤⑩ of IC801	Voltage changes every mode shift
3.	E012	No mode shift after loading motor turns in unloading direction for 5 seconds.	Same as above	Same as above
4.	E020	H. SW. Pininput absent	Pin ⑮ of IC801	 DC5V
5.	E025	TU. REEL sensor input absent	Pin ⑬ of ICA801	 DC5V
6.	E026	SUP REEL sensor input absent	Pin ⑭ of IC801	Same as above

- * If abnormal phenomenon appears at checkpoints, find out the cause according to troubleshooting.
- * If Error No. is not erased in Test mode, turn off the DC power supply once to reset IC801 and IC805 after repairing.

7) Troubleshooting Procedures

No.	Error Indications	Corrective action
1	E007	- Set up for Test mode by connecting a 8.2 kohm resistor between pin ② of connector AT and GND, and push FF or REW button. - Are pulses inputted to pin ⑥⑩ of IC801? - If pulses are inputted to pin ⑪ of IC701, check solder joint at pin ⑥⑩ of IC801. - If no pulse is inputted to pin ⑪ of IC701, check capstan motor unit.
2	E011	- Put the cassette drive in STOP condition. Then, press PLAY or REC button to load the tape and see if any voltage is applied across both leads of the loading motor? - If voltage is applied, check the following: - Is cassette drive mechanism stuck? - Poor connection at pin ⑤ of connector MF or AF ? - If voltage is not applied, check the following: - Do forward and reverse winding signals (2.5 VDC) appear at pins ⑤⑧ and ⑤⑨ of IC801? - Are outputs available at pins ② and ⑩ of IC704? - Is power supplied to pins ⑦ and ⑧ of IC704?
3	E012	Same as No. 2 above
4	E020	- Set up for Test mode and push PLAY button. Then, check if the drum is rotating. - If the drum is rotating, check the following: 2-1 Are 30 Hz pulses inputted to pin ⑮ of IC801? 2-2 Are 30 Hz pulses outputted from pin ②⑧ of IC701? 2-3 Does 0.8 Vp-p DRUM FG signal appear at pin ⑥ of IC701? 2-4 Is 2 mVp-p FG input available at pin ⑤ of IC701? - If the drum is not rotating, check the following: 3-1 Is pin ③④ of IC801 kept to low level? 3-2 Is DRUM CTL signal sent to pin ⑥ of IC701?
5	E025	- Set up for Test mode and press PLAY FF or REW button. - Are reel pulses inputted in pin ⑬ of IC801? - Check solder joints of Q817, R868, R869, R870, R871 and C813. - Is 5.1 V (P-CON) supplied to pin ⑤ of intermediate connector AG or MG? - Check solder joints of R8012 and Q8011 on reel sensor PWB.
6	E026	- Set up for Test mode and press PLAY, FF or REW button. - Are reel pulses inputted to pin ⑭ of IC801? - Check solder joints of Q818, R872, R873, R874, R875 and C814. - Is 5.1 V (P-CON) supplied to pin ⑤ of intermediate connector AG or MG? - Check solder joints of R8014 and Q8012 on reel sensor PWB.

Cassette Housing's Failure to Eject Cassettes

Turn the power on and press the EJECT button to see if a cassette is ejected out of the cassette housing.
If not, take the following steps.

Remove battery or unplug DC cable to keep unit off.

Is cassette tape in ?

No

Detach cassette controller top cover. Push EJECT shifter with a screwdriver or the like. (Fig. A)

Detach cassette controller top cover, cabinets A and B, and main PWB.

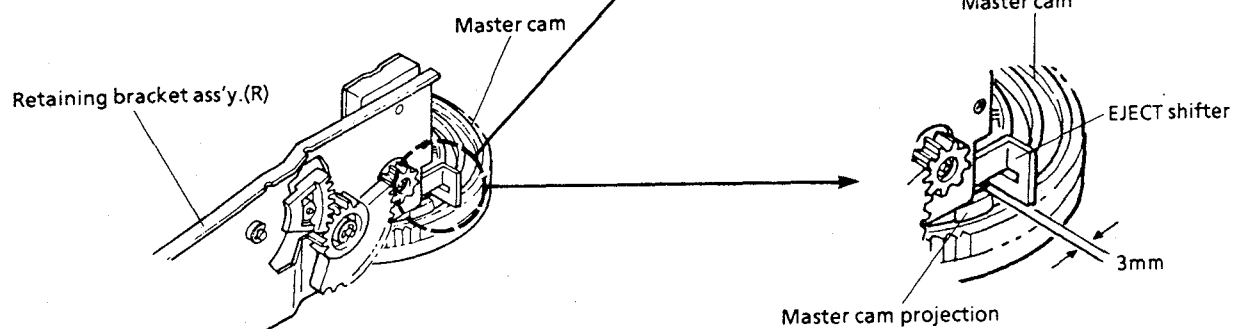
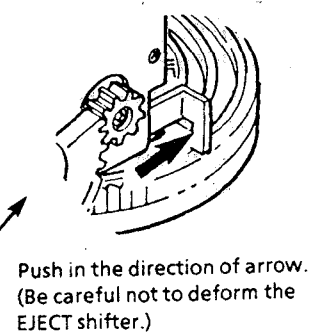
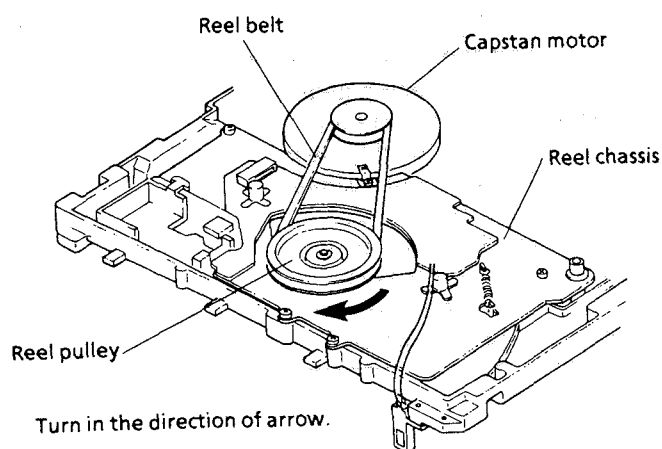
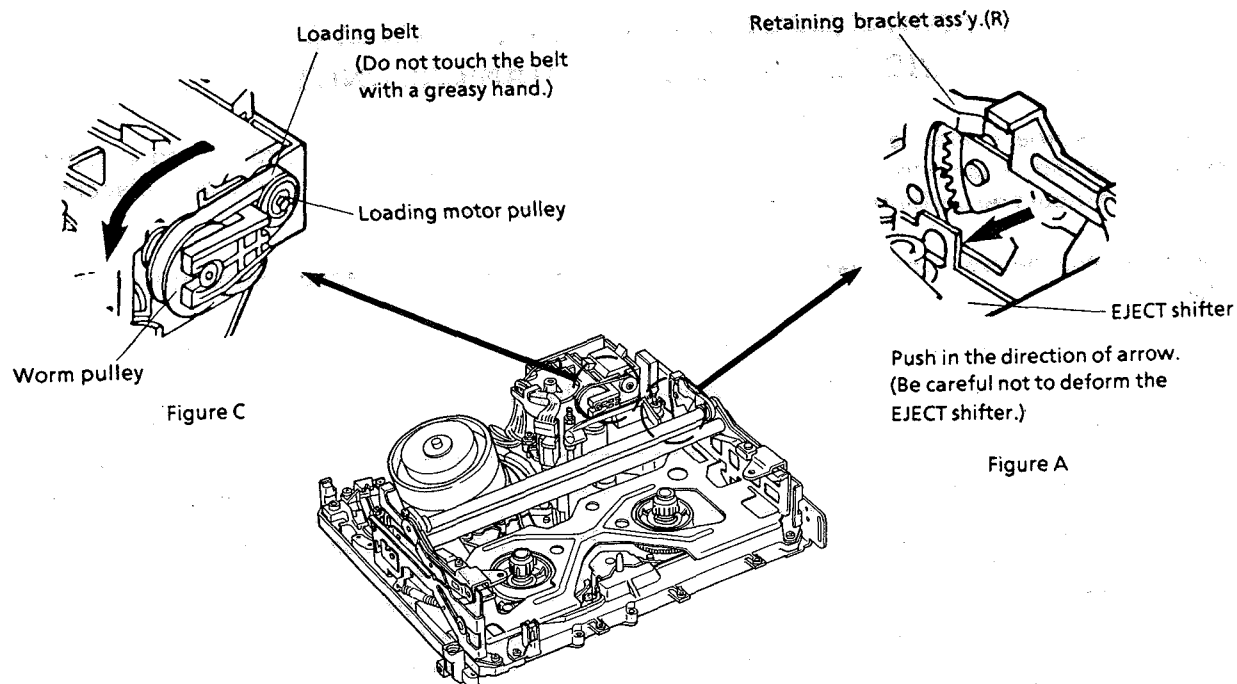
Note 1: Bear in mind that the customer's cassette tape should not be damaged. Be sure to remove the cabinets A and B as well as the main PWB in the step.

Is tape loaded ?

No

Turn loading block worm pulley (Fig. C) in arrow direction — up to the position in Fig. E, not all the way to the EJECT position — to unload pole base. Then rotate reel pulley (Fig. D) to wind up tape to see if tape is tight. Push cassette controller EJECT shifter (Fig. B) to lift cassette controller.

Turn loading block worm pulley to bring master cam up to the position in Fig. E. Rotate reel pulley (behind mechanism) to make sure tape is tight. (Fig. D) Now push cassette controller EJECT shifter. (Fig. B)



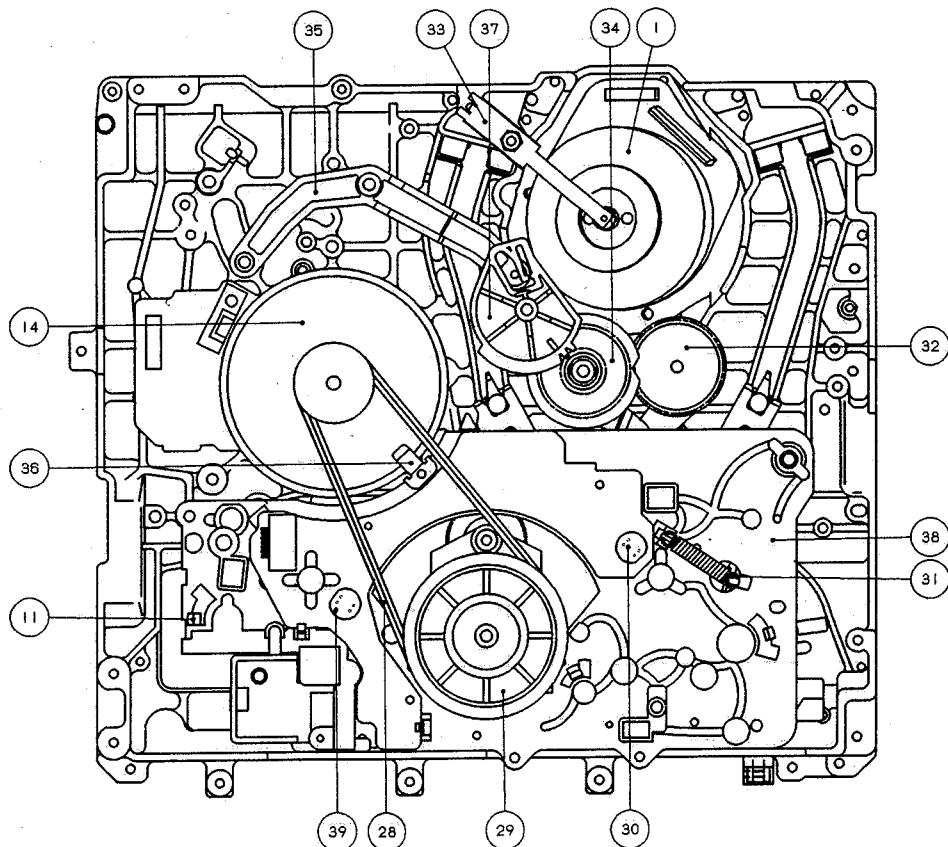
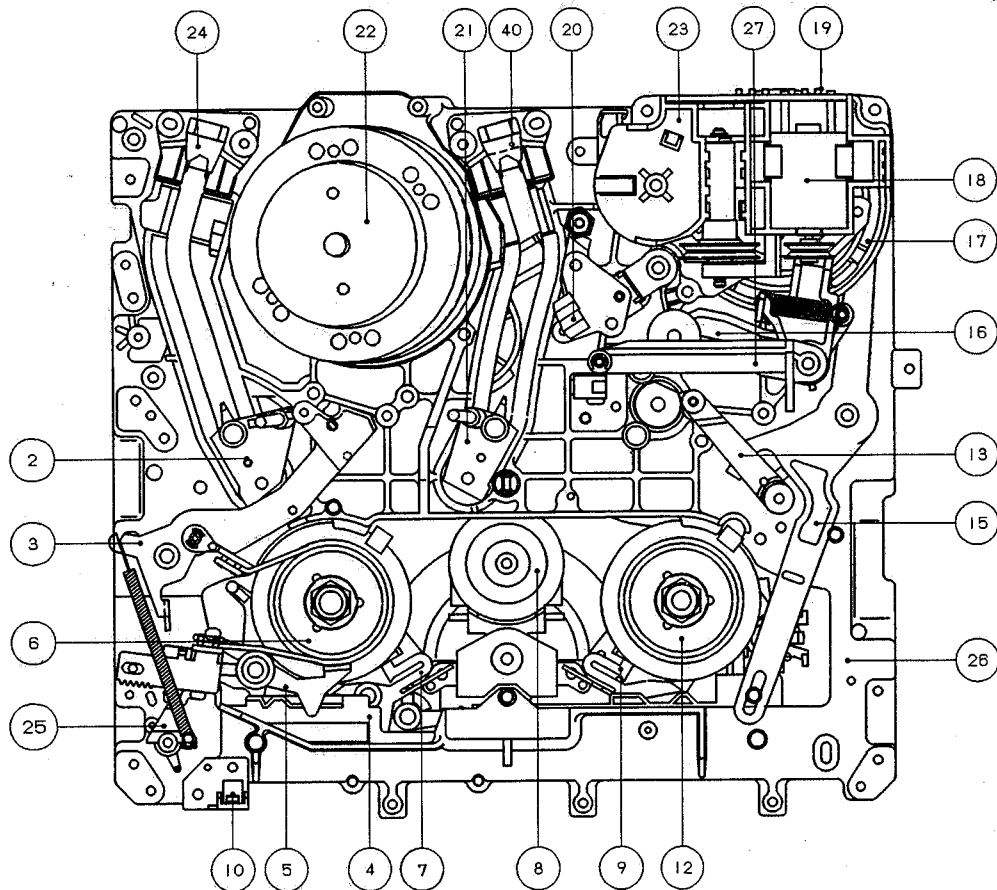
ADJUSTMENT, REPLACEMENT, ASSEMBLY AND CLEANING OF MECHANICAL UNITS

Here we will describe a relatively simple service work in the field, not referring to the more complicated repairs which would require the use of special equipment and tools (drum assembly or replacement, for example, which should be performed by a qualified service personnel.)

* AC Adapter must be used for the power supply when checking and adjustment of mechanism are performed.

Mechanism Parts

No.	Name	No.	Name
1.	Drum motor	21.	Take-up pole base
2.	Supply pole base	22.	Drum ass'y
3.	Tension arm	23.	Loading block ass'y
4.	Brake shifter	24.	Supply V-block
5.	Back tension lever	25.	Tension adjust plate
6.	Supply reel disk	26.	Main chassis
7.	Supply main brake	27.	Cassette opener
8.	Reel idler	28.	Reel belt
9.	Take-up main brake	29.	Reel pulley
10.	Cassette erase protection switch	30.	Supply reel sensor
11.	V/S (video search) brake lever	31.	Fast forward brake lever
12.	Take-up reel disk	32.	Supply loading gear
13.	Reverse guide	33.	Ground brush ass'y
14.	Capstan D.D. motor	34.	Take-up loading gear
15.	Relay shifter	35.	Relay gear drive lever
16.	Pinch roller lever ass'y	36.	Capstan bracket
17.	Master cam	37.	Loading relay gear
18.	Loading motor	38.	Reel unit chassis
19.	Cam switch	39.	Take-up reel sensor
20.	A/C head	40.	Take-up V-block



MECHANICAL PARTS REQUIRING PERIODIC INSPECTION

Use the following table as a guide to maintain the mechanical parts in good operating condition.

Parts	Maintained every	500 hrs.	1000 hrs.	1500 hrs.	2000 hrs.	3000 hrs.	Possible symptom encountered	Remarks
Guide roller ass'y		☐	☐	☐	☐	☐	Lateral noises Head occasionally blocked	Abnormal rotation or significant vibration requires replacement.
Supply impedance roller		☐	☐	☐	☐	☐		Clean with pure high quality isopropyl alcohol.
Supply impedance roller (inner)			☐		☐	☐		Clean tape contact area with the specified cleaning liquid.
Supply impedance roller flange B		☐	☐	☐	☐	☐		
Retaining guide		☐	☐	☐	☐	☐		
Slant pole		☐	☐	☐	☐	☐		
Video head		☐	☐	☐	☐	☐	Poor S/N ratio, no color	Clean tape contact area with the specified cleaning liquid.
Full erase head		☐	☐	☐	☐	☐	Poor color, beating	
A/C head		☐	☐	☐	☐	☐	Sound too small or distorted	
Capstan D. D. motor		☐	☐	☐	☐	☐	No tape running, uneven color	
Pinch roller		☐	☐	☐	☐	☐	No tape running, tape slack	Clean rubber and rubber contact area with the specified cleaning liquid.
Reel belt			☐		☐		No tape running, tape slack, no fast forward / rewind motion	Clean rubber and rubber contact area with the specified cleaning liquid.
Loading belt			☐		☐		Cassette not loaded or unloaded	
Tension band ass'y						☐	Lateral image swing	
Loading motor					☐		Cassette not loaded or unloaded	
Reel block*							See the chart below.	

* See the table below for servicing the reel block parts.

Supply / Take-up reel disks	☐	☐	☐	☐	☐	No tape running, tape, slack	Clean with pure high quality isopropyl alcohol.
Main supply / take-up brake levers				☐		Tape slack	
V.S brake lever				☐			
Idler gear ass'y				☐		No tape running	
Reel pulley		☐		☐			

Note:
☐: Part replacement
☐: Cleaning (For cleaning, use a lint-free cloth dampened with pure isopropyl alcohol)
☐: Oil refilling (The indicated point should be lubricated with high quality spindle oil every 1000 hrs.)

This model has no adjusting volumes for torques, tension, etc. If the reading is outside the specified range, clean or replace the part

● REMOVING THE CASSETTE HOUSING

Disassembly

1. Place the cassette housing in its home position.
2. Disconnect the cassette housing connectors.
3. Remove the four cassette housing screws ①.
4. Pull up the cassette housing.

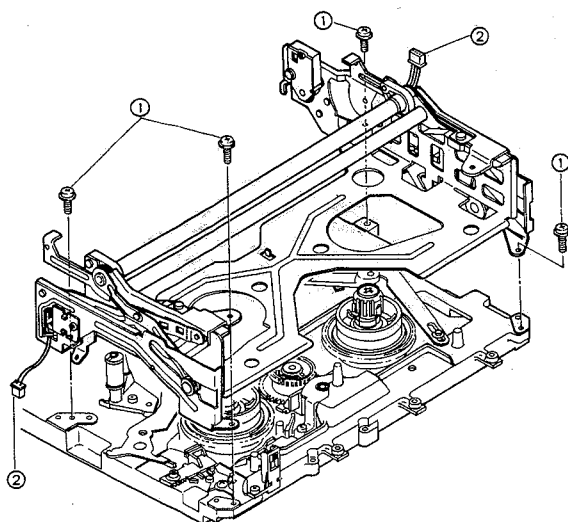


Figure 1-1.

Reassembly

1. Place the cassette housing in position on the mechanism. Tighten the four screws ①.
2. Reconnect both the cassette housing connectors ②.

Note:

1. Be careful not to damage any parts around during the above steps.

Tape traveling without the cassette housing:

1. There is an AI connector on the PWB whose connectors have been uncoupled from the cassette housing. Short-circuit pins ③ and ④ on this connector (at main PWB side.)
2. Load a cassette in position, and put a 500g or lighter weight on it to keep it in position.
 - ※ When running a tape without the cassette housing in the drive, be sure not to load a cassette with its tape fully wound on the take-up reel.

● REPLACEMENT OF CASSETTE HOUSING DAMPER (Gear phase matching)

Disassembly

1. Unscrew the damper fixing screw and remove the damper.

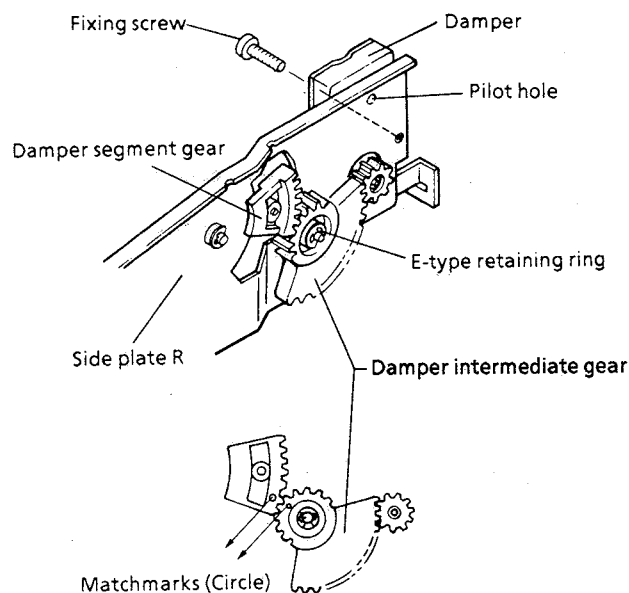
Reassembly

1. Align the damper with the matchmark on side plate R.

2. Engage the damper gear with the damper intermediate gear.
3. Fasten the fixing screw.

Note

When reassembling the damper, make sure the matchmark on the damper segment gear aligns with the matchmark on the damper intermediate gear. (Phase matching is not required between the damper gear and damper intermediate gear.)



Housing mounted in position

Figure 1-2.

● REPLACEMENT OF REEL BLOCK ASSEMBLY AND REEL DISK, AND REEL DISK HEIGHT ADJUSTMENT

1. Select the FF/REW mode with no cassette loaded, and unplug the power cord from the power outlet.
2. Remove the Main PWB.

Removing the reel block assembly

1. Remove washer ①.
2. Remove the reel belt.
3. Unplug the connector of the erase protect switch.
4. Loosen screw ② and remove the capstan retaining bracket.
5. Loosen four screws ③ and remove the reel block assembly.

Notes:

- 1) Be careful not to deform the tension belt.
- 2) Be careful not to damage the reel disk gear and swing gear.

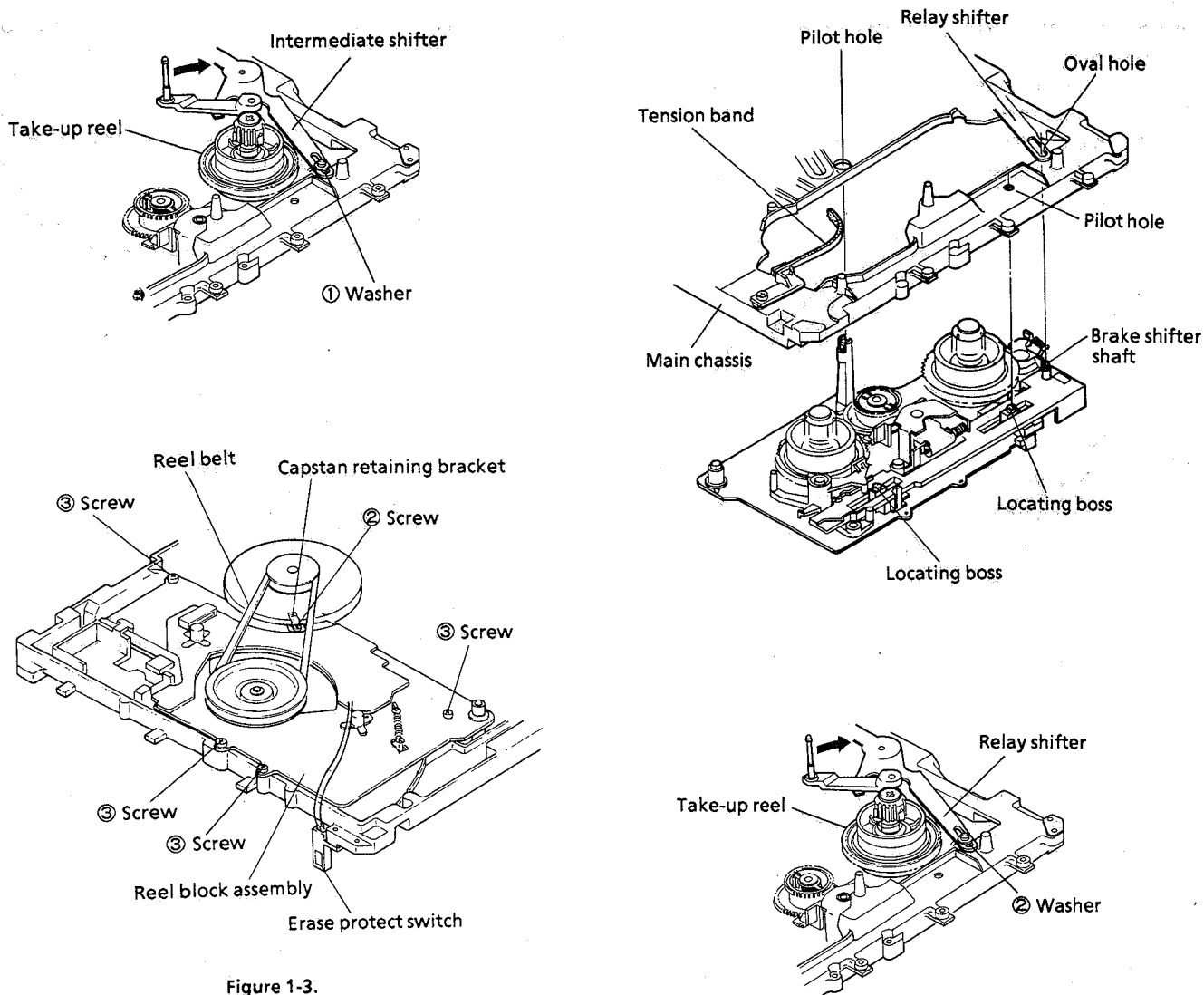


Figure 1-3.

Reassembling the reel block assembly

1. Mount the reel block assembly to the main chassis.

Notes:

- 1) Utmost care should be taken to avoid deformation of the tension band.
- 2) The brake shifter shaft should pass through the oval hole of the relay shifter.
- 3) The locating boss should align with the pilot hole in the chassis.

2. Tighten four screws ①.
3. Put the capstan retaining bracket in position and fix it.
4. Solder the leads of the erase protect switch on the reel unit PWB.
5. Attach the reel belt.
6. Fit washer ②.

Note:

Take care so that grease or oil does not adhere to the reel belt.

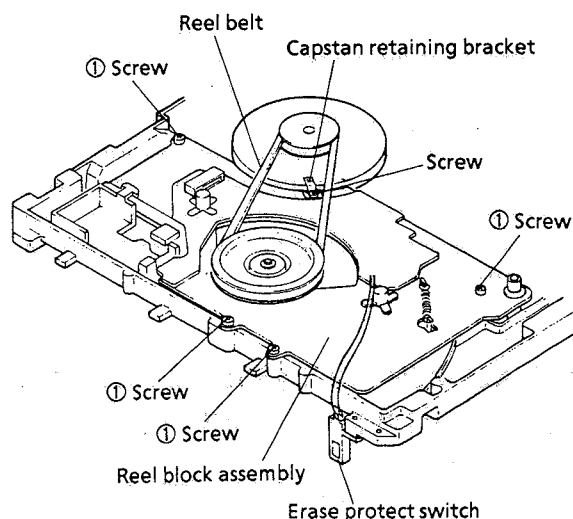


Figure 1-4.

● REPLACEMENT AND HEIGHT ADJUSTMENT OF REEL DISK

Note:

The reel disk can be replaced only after the reel block assembly has been removed from the main chassis. This is intended to facilitate check and adjustment of the reel height in the mode in which the main brake does not work. Select the FF/REW mode with no cassette loaded, and unplug the power cord from the power outlet.

Disassembly

[Supply reel disk]

1. While disengaging the supply reel disk stopper and back tension.
2. Pull out the supply reel disk upward.

Note:

Be careful not to damage the reel disk gear and the swing gear.

Replace reel disk after removing reel block assembly.

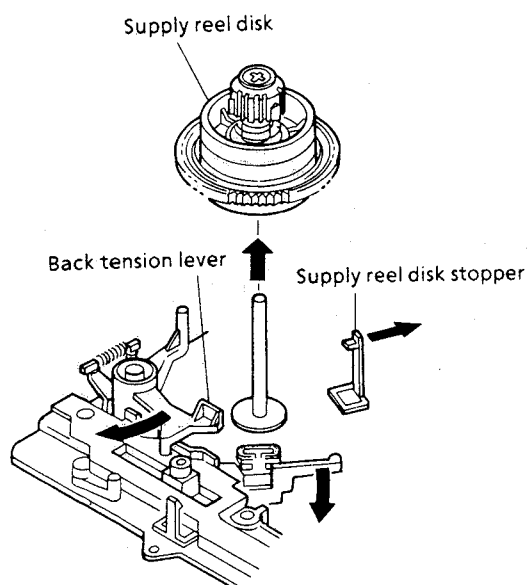


Figure 1-5.

[Take-up reel disk]

1. While disengaging the take-up reel disk stopper.
2. Pull out the take-up reel disk upward.

Replace reel disk after removing reel block assembly.

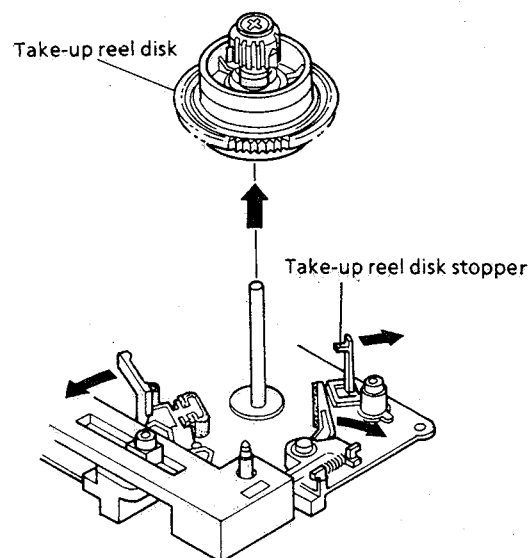


Figure 1-6.

Reassembly

[Supply reel disk]

1. Clean the reel disk shaft and apply oil (Shell Terace #32) to it.
2. While moving aside the supply reel disk stopper, back tension lever and supply side main brake.
3. Mount the supply reel disk in position.

Notes:

1. Utmost care should be taken to avoid deformation of the tension band when mounting the supply reel disk.
2. Be careful not to damage the supply reel disk gear, back tension lever, stopper, etc. by tools.
3. Check the tension pole position referring to page 32.

Mount reel disk before reassembling reel block assembly onto main chassis.

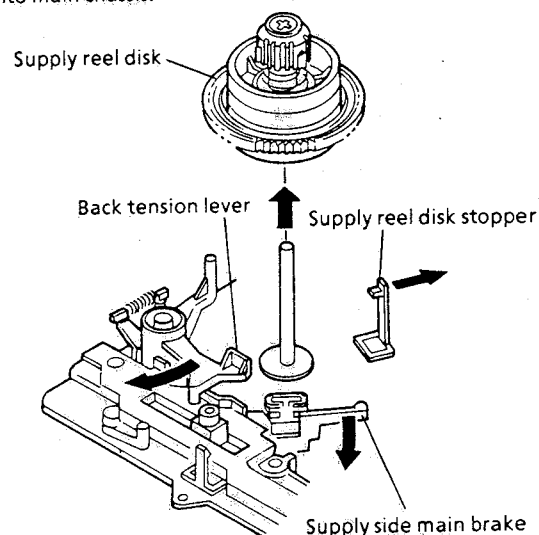


Figure 1-7.

[Take-up reel disk]

1. Clean the reel disk shaft and apply oil (Shell Terrace #32) to it.
2. While moving aside the take-up reel disk stopper, back tension lever and take-up side main brake.
3. Mount the take-up reel disk in position.

Note:

Be careful not to damage the VS (video search) brake.

★ After reassembly, check the VS (video search) back tension referring to page 35 and the brake torque.

Replace reel disk after removing reel block assembly.

Clean reel disk well and apply oil (Shell Terrace 32).

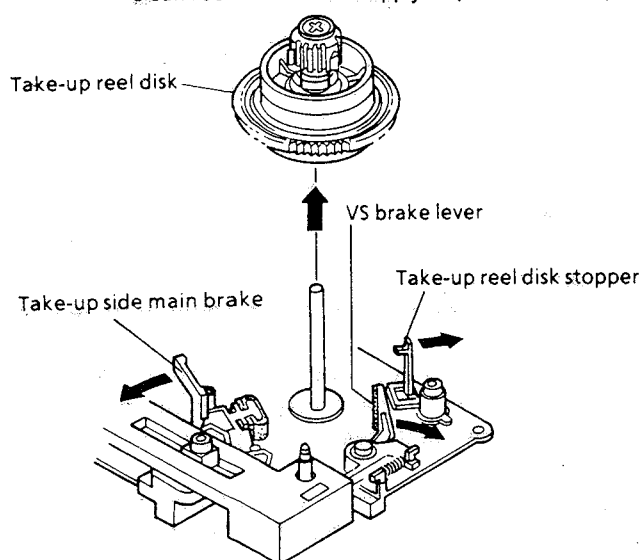


Figure 1-8.

Reel disk height adjustment**Note:**

1. Utmost care should be taken so as not to hit master plane-A against drum when setting up jig onto mechanism.

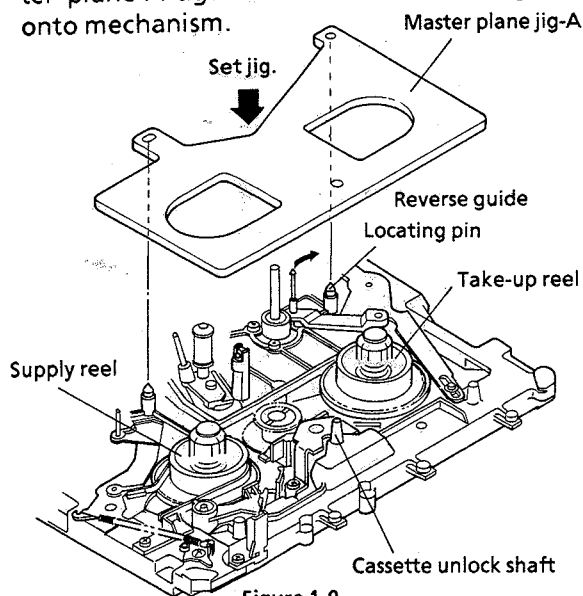


Figure 1-9.

Set master plane while pushing aside reverse guide.

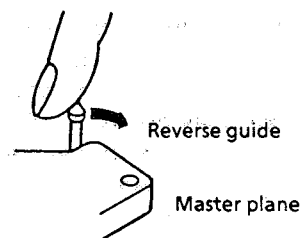
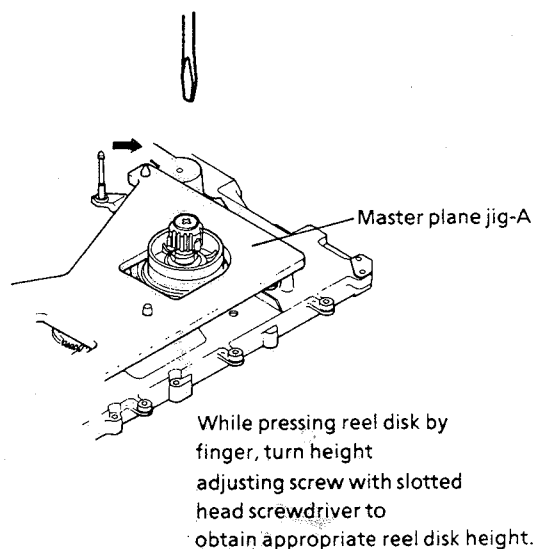
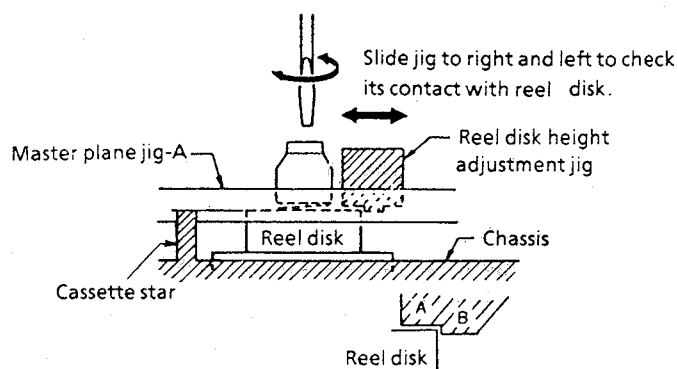


Figure 1-10.

2. Be sure to check and adjust reel disk height after replacing reel disk.



(a)



(b)

Check if reel disk top is lower than section A and higher than section B. If not, adjust reel disk height by turning height adjusting screw.

Figure 1-11.

● REPLACEMENT OF CASSETTE LED

1. Unplug the power cord from the power outlet.
2. Remove the Main PWB.

Disassembly

1. Unsolder the leads of the cassette LED.
2. Remove the LED out of the cassette LED holder.

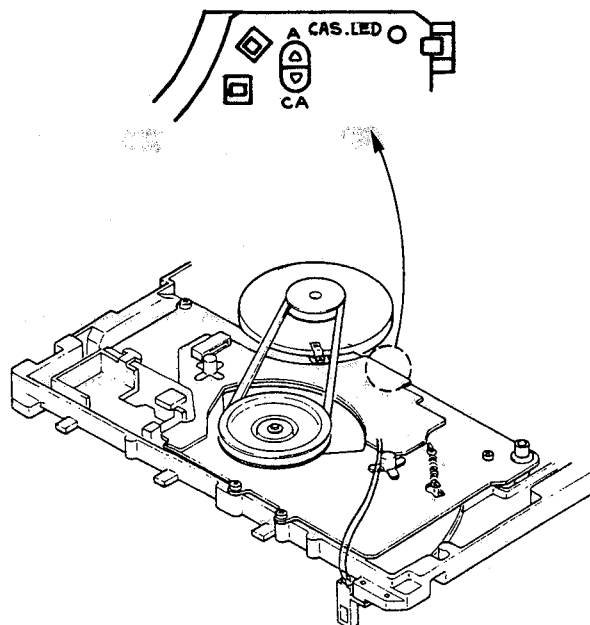


Figure 1-12.

Reassembly

1. Insert the LED into the cassette LED holder.
2. Solder the anode (longer lead) and cathode of the LED.

Note:

Be careful of the polarity of the LED. The figure below illustrates proper and improper positions of the LED.

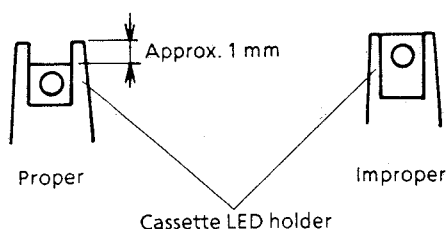
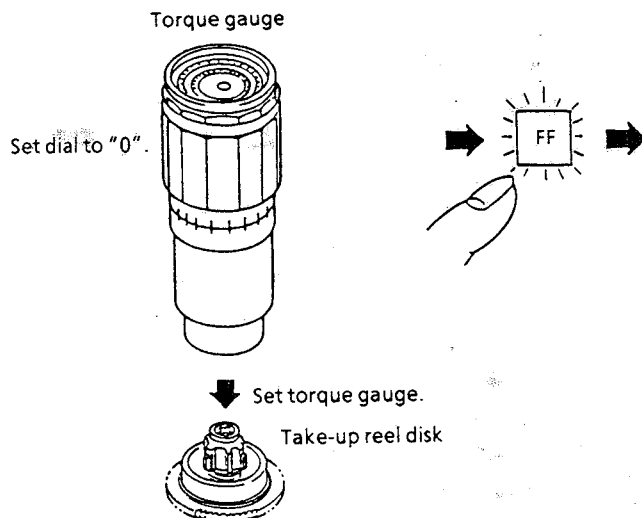


Figure 1-13.

● CHECK AND ADJUSTMENT OF FAST FORWARD TORQUE

1. Remove the cassette housing.

(1) Setting the torque gauge



(2) Checking the torque

Slowly turn torque gauge clockwise (about one turn every 2 to 3 seconds).

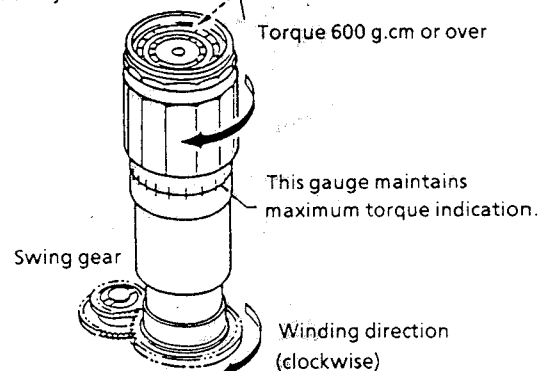


Figure 1-14.

Adjustment

1. In case the fast forward torque falls short of the rated value, clean the capstan DD motor pulley, reel belt and reel pulley with cleaning liquid. Then, measure the torque again.
2. If the torque still measures below the rating, replace the reel belt.

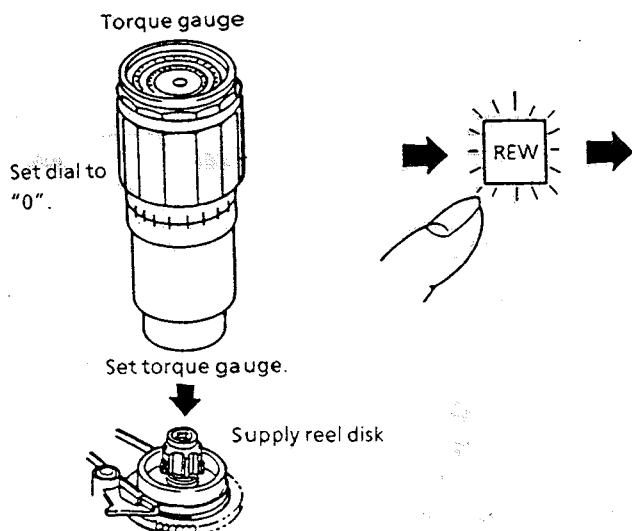
Notes:

1. When measuring the torque, secure the torque gauge by hand so as not to let it loose.
2. Do not put the reel disk in a locked position and finish the measurement within a short time.

● CHECK AND ADJUSTMENT OF REWIND TORQUE

1. Remove the cassette housing.

(1) Setting the torque gauge



(2) Checking the torque

Slowly turn torque gauge counterclockwise (about one turn every 2 to 3 seconds).

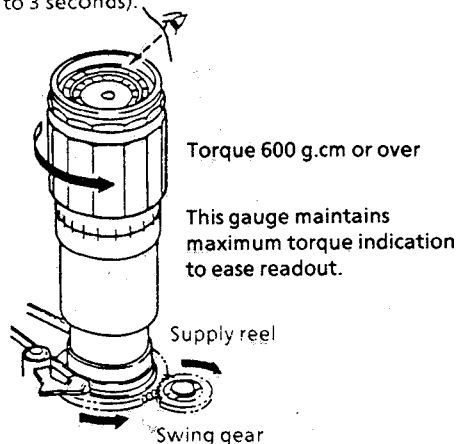


Figure 1-15.

Adjustment

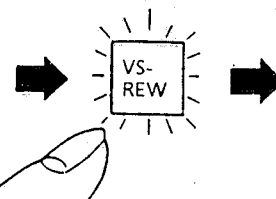
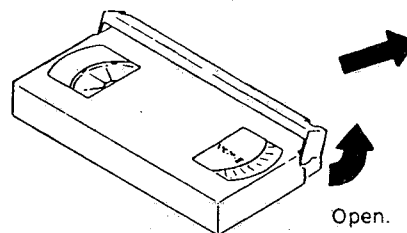
1. In case the fast forward torque falls short of the rated value, clean the capstan DD motor pulley, reel belt and reel pulley with cleaning liquid. Then, rewind the tape and measure the fast forward torque again.
2. If the torque still measures below the rating, replace the reel belt.

Notes:

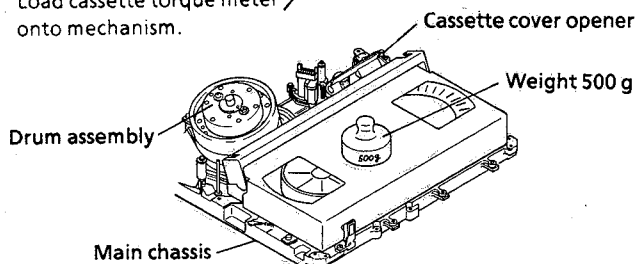
1. When measuring the torque, secure the torque gauge by hand so as not to let it loose.
2. Do not put the reel disk in a locked position and finish the measurement within a short time.

● CHECK AND ADJUSTMENT OF PLAYBACK TORQUE

1. Remove the cassette housing.



Load cassette torque meter onto mechanism.



Rated torque 100 ± 30 g.cm (SP mode)

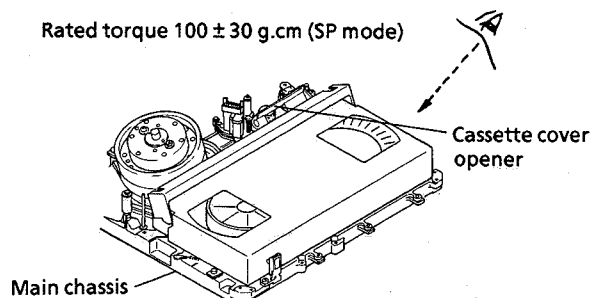


Figure 1-16.

Checking

1. Check that the measured torque is within the specified range.
2. The take-up torque indication will fluctuate due to the variation in the turning torque of the reel drive unit.
Read out the torque at the center of the fluctuation.
3. Check that the take-up torque is within the specified range in the SP record mode (normal speed).

Adjustment

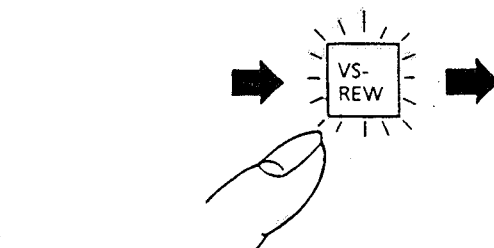
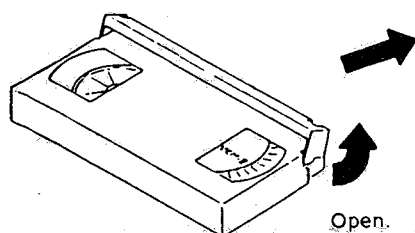
1. If the take-up torque in the playback mode does not fall within the specified range, replace the take-up reel disk.

Note:

After loading the torque cassette meter, place a weight on top to keep it in position.

● CHECK AND ADJUSTMENT OF VIDEO SEARCH REWIND (VS-REW) TORQUE

1. Remove the cassette housing.



Load cassette torque meter onto mechanism.

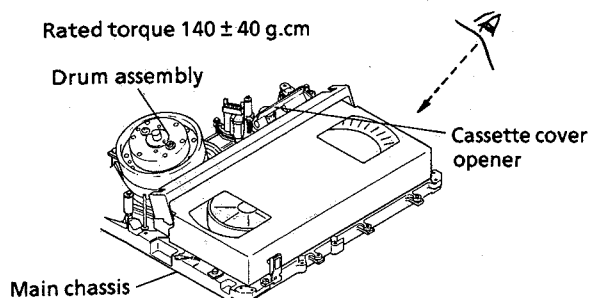
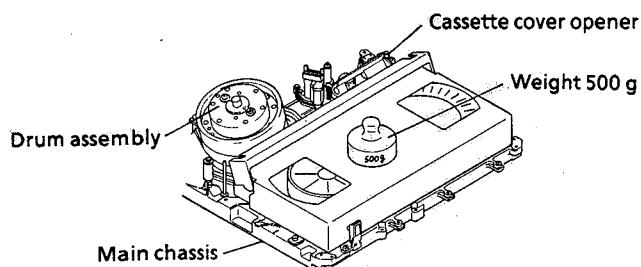


Figure 1-17.

Checking

Load the cassette torque meter and select the SP record mode. Check that the measured torque is within the specified range (140 ± 40 g.cm).

Adjustment

1. If the take-up torque in the playback mode does not fall within the specified range, replace the take-up reel disk.

Note:

The take-up torque indication will fluctuate due to the variation in the turning torque of the reel drive unit. Read out the torque at the center of the fluctuation.

● CHECKING THE FAST FORWARD BACK TENSION

1. Remove the cassette housing.
2. Select the FF or REW mode and unplug the power cord.
3. Set the swing gear at the middle position.

Checking

Set the torque gauge onto the supply reel disk. While turning the torque gauge slowly clockwise (one rotation every 2 to 3 seconds), check that the torque indication is within the range of 23 ± 5 g.cm.

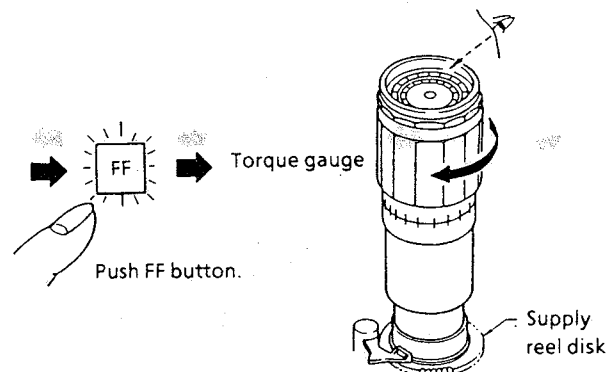


Figure 1-18.

Note:

Set the torque gauge securely on the reel disk. Measurement will be inaccurate if the torque gauge is not tight on the reel disk.

● CHECKING THE REWIND BACK TENSION

1. Remove the cassette housing.
2. Select the FF or REW mode and unplug the power cord.
3. Set the swing gear at the middle position.

Checking

Set the torque gauge onto the take-up reel disk. While turning the torque gauge slowly counter-clockwise (one rotation every 2 to 3 seconds), check that the torque indication is within the range of 23 ± 5 g.cm.

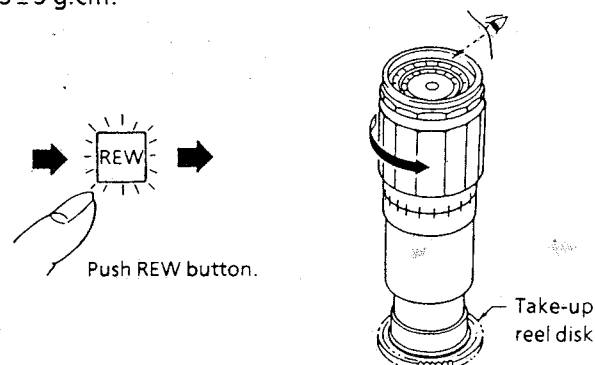


Figure 1-19.

Note:

Set the torque gauge securely on the reel disk. Measurement will be inaccurate if the torque gauge is not tight on the reel disk.

● CHECKING THE VIDEO SEARCH REWIND (VS-REW) BACK TENSION

1. Remove the cassette housing.

Checking

Set the torque gauge onto the take-up reel disk. While turning the torque gauge slowly counterclockwise (one rotation every 2 to 3 seconds), check that the torque indication is within the range of 45 ± 20 g.cm.

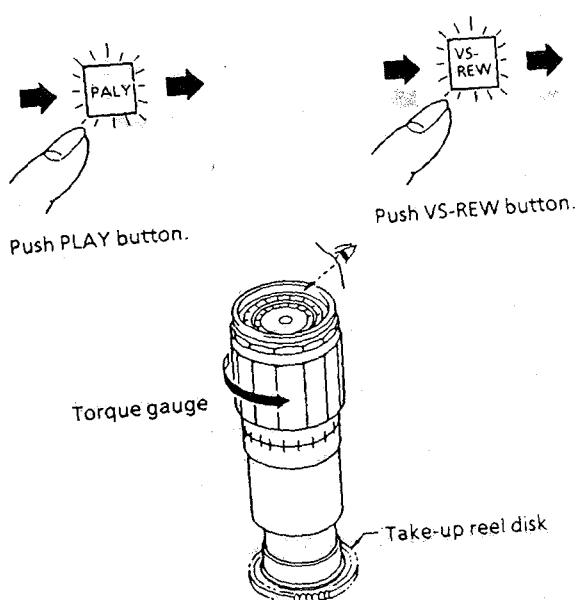


Figure 1-20.

Note:
Set the torque gauge securely on the reel disk. Measurement will be inaccurate if the torque gauge is not tight on the reel disk.

● CHECKING THE PINCH ROLLER PRESSURE

1. Remove the cassette housing.

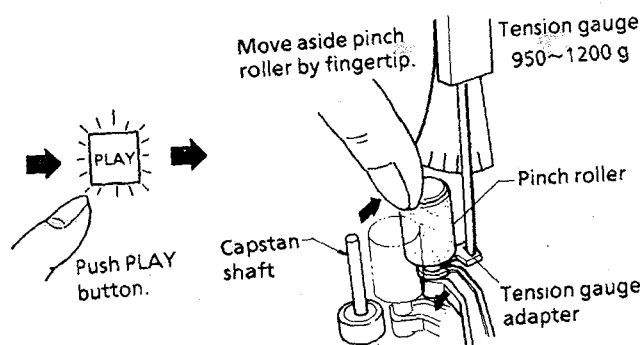


Figure 1-21.

1. Move aside the pinch roller off the capstan shaft.
2. Hook the tension gauge adapter onto the pinch roller shaft and set the tension gauge.
3. Slowly return the pinch roller to its position, and read the tension gauge indication when the pinch roller just comes into contact with the capstan shaft.
4. Check that the indication falls within the range of 950 to 1200 g.

● CHECK AND ADJUSTMENT OF TENSION POLE POSITION

1. Remove the cassette housing.

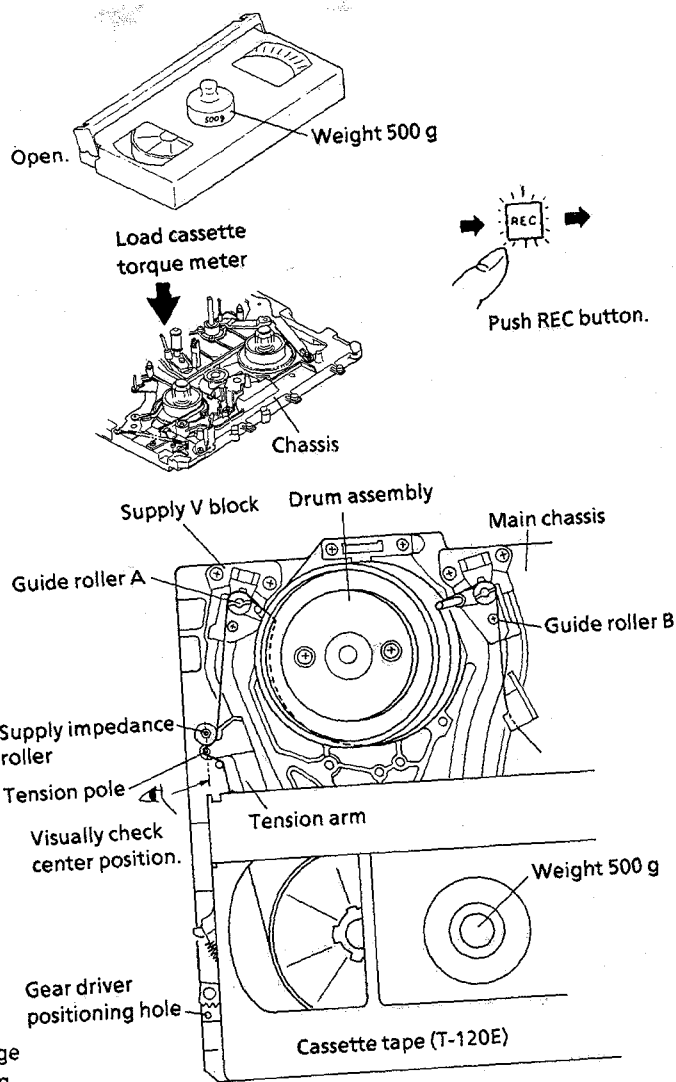


Figure 1-22.

1. As the guide rollers (A and B) take the tape out of the cassette, the tension pole swings to the left-hand side to start tape loading. Check the tension pole position at the end of tape loading.
2. Visually check that the center of the supply impedance roller aligns with the center of the tension pole at the start of the tape (T-120E).

3. Check that the tape does not curl around the flange of the supply impedance roller or ride over the flange near the tape end.
4. Remove the cassette tape (T-120E) and check that the tension band is released from the reel disk in the VS-REW mode.

(Tension pole position adjustment (REC mode))

- a) When tension pole is located to the right of supply impedance roller center

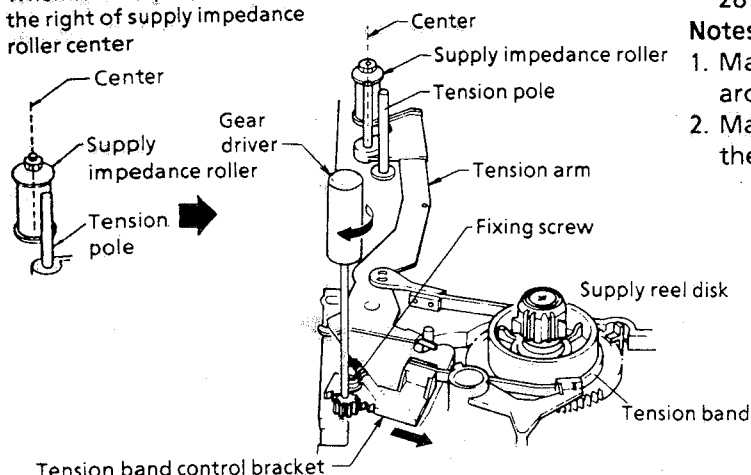


Figure 1-23.

Loosen the fixing screw and move the tension band control bracket in the direction of arrow. Tighten the fixing screw where the tension band control bracket comes at the center of the supply impedance roller.

- b) When tension pole is located to the left of supply impedance roller center

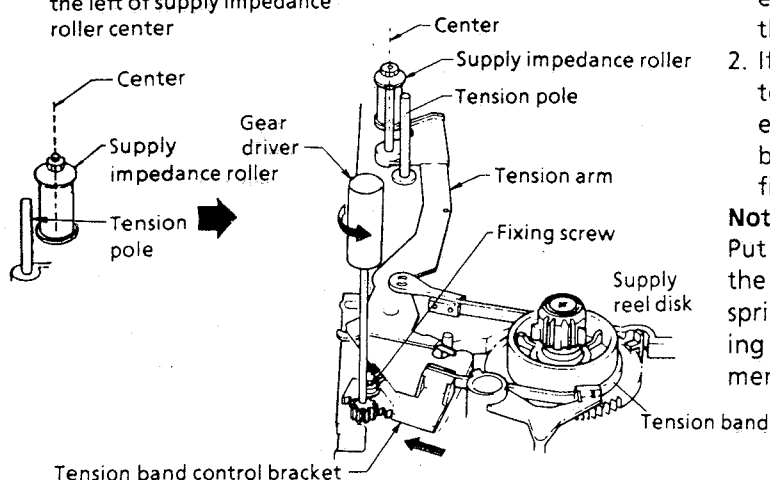


Figure 1-24.

Loosen the fixing screw and move the tension band control bracket in the direction of arrow. Tighten the fixing screw where the tension band control bracket comes at the center of the supply impedance roller.

● CHECK AND ADJUSTMENT OF RECORD/PLAYBACK BACK TENSION

1. Remove the cassette housing.

Checking

1. Load the torque cassette meter onto the mechanism.
2. Push the REC button to select the record mode.
3. Check that the torque cassette meter indicates a back tension within the specified range of 23 to 28 g.cm.

Notes:

1. Make sure the video cassette tape is wound around the retaining guide.
2. Make sure the tape is not slack or damaged on the edges at its both ends.

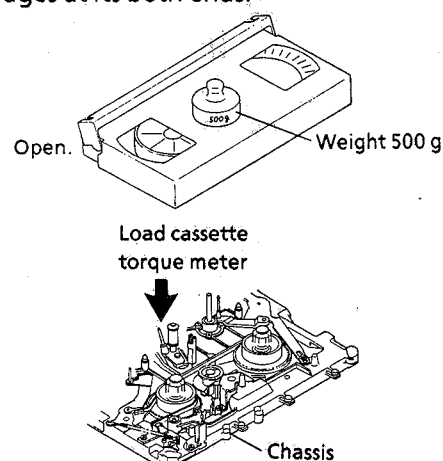


Figure 1-25.

Adjustment

1. If the torque cassette meter indication is lower than the specified range (23 to 28 g.cm), move the tension spring hook plate to align its pointed end with boss A so that the torque falls within the specified range.
2. If the torque cassette meter indicates a higher torque than the specified range, move the pointed end of the tension spring hook plate toward boss B so that the torque falls within the specified range.

Note:

Put the tip of a small slotted head screwdriver in the slot provided on the shaft head of the tension spring hook plate. Turn the screwdriver while tilting it toward yourself to facilitate the above adjustment.

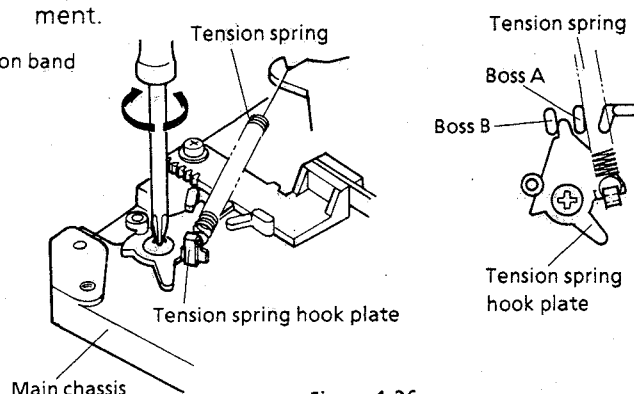


Figure 1-26.

● PLAYBACK BACK TENSION MEASUREMENT WITH TAPE TENSION GAUGE (FOR REFERENCE ONLY)

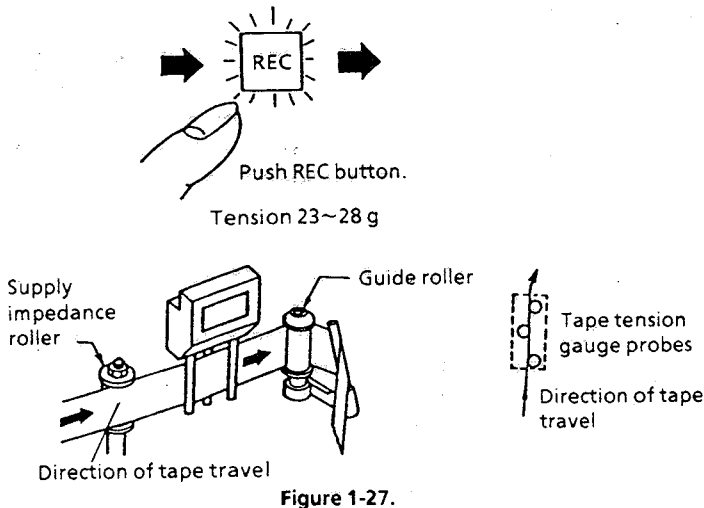


Figure 1-27.

Checking

Place the tape tension gauge on the tape just between the FE head and guide roller A at the start of the cassette tape (T-120E). Check that the tape tension gauge indication is within the specified range (23 to 28 g).

Adjustment

If the back tension does not fall within the specified range, adjust it by the same procedure as described in see page 32.

Notes:

1. Be carefully not to allow the tape tension gauge to touch the FE head and drum.
2. Be sure to check that there is no scratch or dirt on the video tape.

● REPLACEMENT OF A/C HEAD

1. Remove the cassette housing.
2. With no cassette loaded in the unit, unplug the power cord.

Removal (Remove parts in the order of step numbers shown below.)

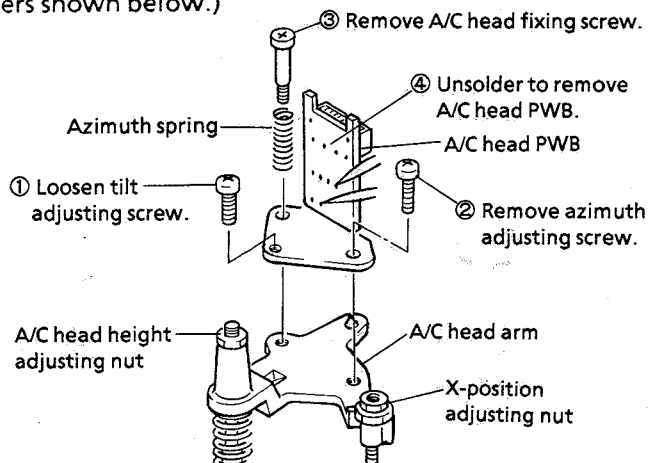


Figure 1-28.

Notes:

1. After replacing the A/C head, be sure to perform tape travel adjustment. Do not touch the face of the A/C head when replacing it.
2. The azimuth spring tends to pop out when the A/C head fixing screw is removed. Be carefully to avoid this.

Replacement

Mount A/C head assembly so that A/C head plate becomes approximately parallel with A/C head arm.

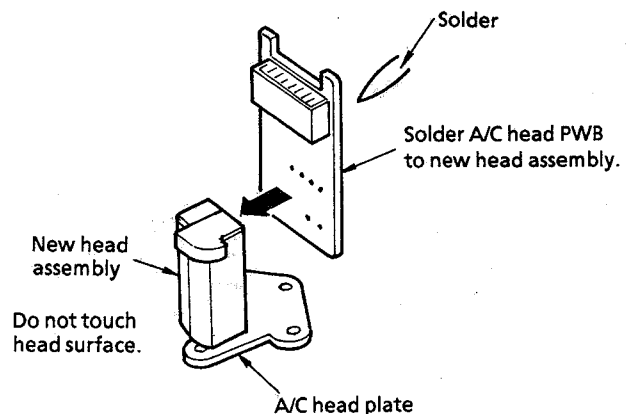


Figure 1-29.

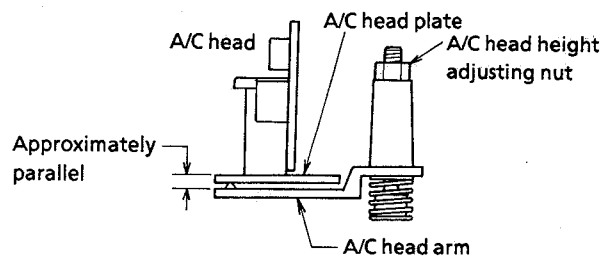


Figure 1-30.

Adjustment**A/C head tilt angle**

1. Set master plane jig-B on the chassis as shown in Fig 1-31.

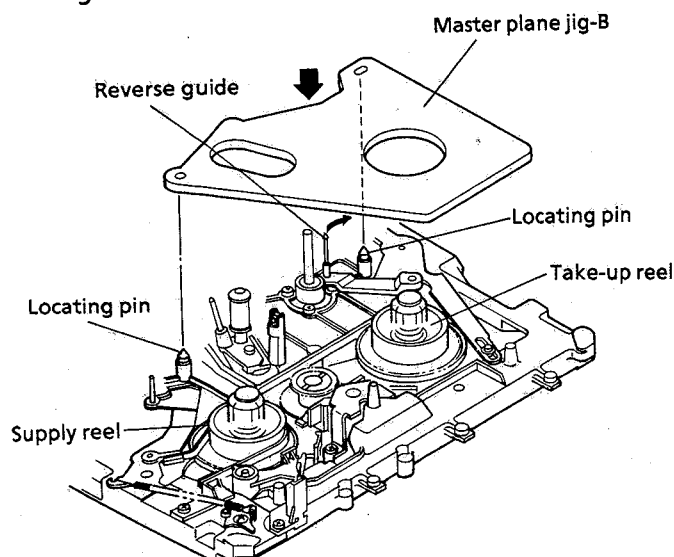
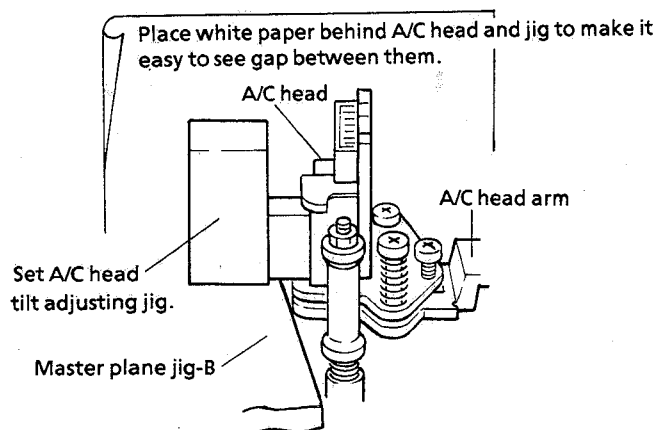


Figure 1-31.



Slowly turn adjusting screw with screwdriver to eliminate gap between A/C head and jig.

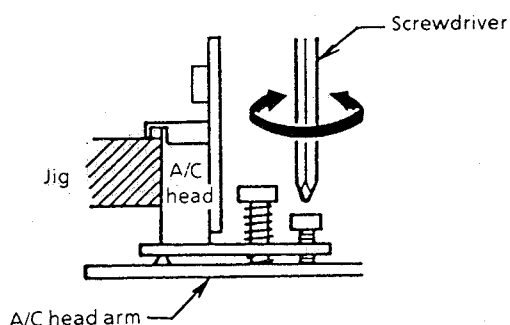


Figure 1-32.

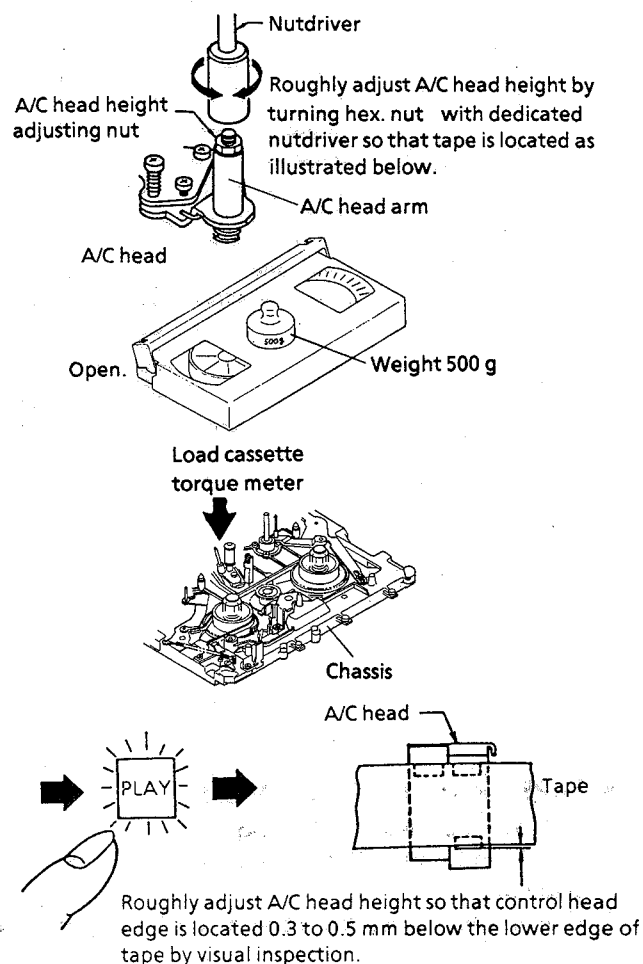
Coarse adjustment of A/C head height

Figure 1-33.

● RETAINING GUIDE AND REVERSE GUIDE HEIGHT ADJUSTMENT

Before coarse adjustment of tape travel, check that the retaining guide and reverse guide heights are within the range shown in Figure 1-34 by using the specified jig.

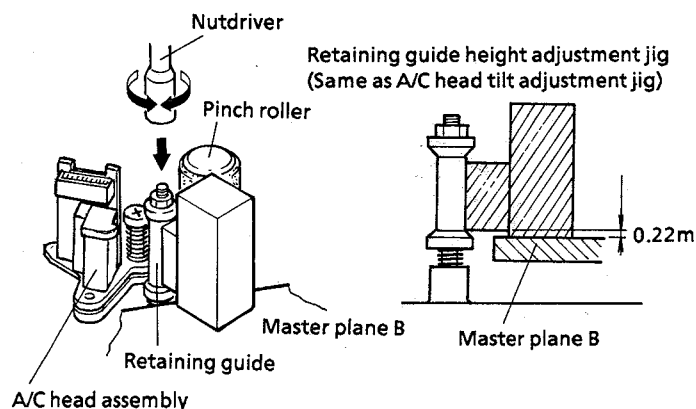
Retaining guide height adjustment

Figure 1-34.

Reverse guide height adjustment

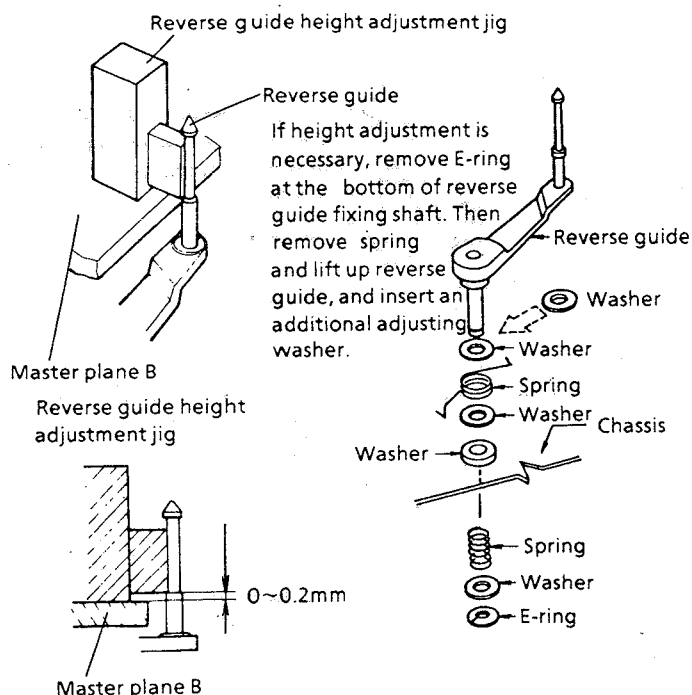


Figure 1-35.

● TAPE TRAVEL ADJUSTMENT

1. Remove the cassette housing.
2. Check and adjust the tension pole position. (see page 32)
3. Check and adjust the rewind back tension (see page 32)
4. Set the A/C head tilt angle. (see page 35)
5. Coarse adjustment of tape transport

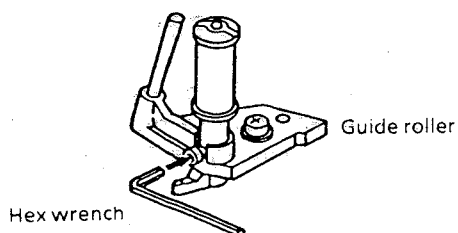


Figure 1-36.

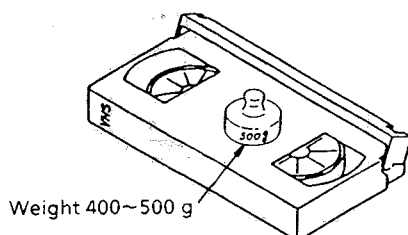


Figure 1-37.

- 1) Connect an oscilloscope to the PB CHROMA envelope output test point. An external trigger should be taken from the head switching pulse test point to the SYNC or EXT jack of the oscilloscope.
- 2) Loosen the fixing screw at the bottom of the guide roller and adjust the guide roller with an adjusting screwdriver to allow its free rotation. (Do not make the fixing screw too loose. Otherwise, irregular rotation of the guide roller may result.)
- 3) Load the tape travel adjusting cassette tape on the reel disks. (Place a weight of 400 to 500 g on top of the cassette tape to keep it in position.)
- 4) Press the [+] and [-] tracking buttons to vary the envelope from the maximum to minimum amplitude, and vice versa. Check that the envelopes vary in the form of almost flat lines.
- 5) If not, adjust the height of both the supply and take-up side guide rollers with the adjusting screwdriver so that the envelopes vary in the form of almost flat lines.

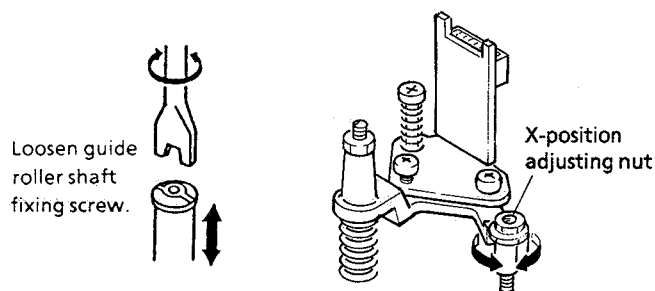


Figure 1-38.

Figure 1-39.

Notes:

1. To ease coarse adjustment of tape travel, it is recommended that the envelopes be preadjusted to a maximum amplitude by turning the X-position adjusting nut with the tracking control set to the center position.
2. Especially, the envelope of the take-up side signal should be adjusted as flat as possible.
- 6) Adjust the height of the retaining guide by using the retaining guide height adjusting nutdriver so that the lower flange of the retaining guide comes into contact with the tape edge.

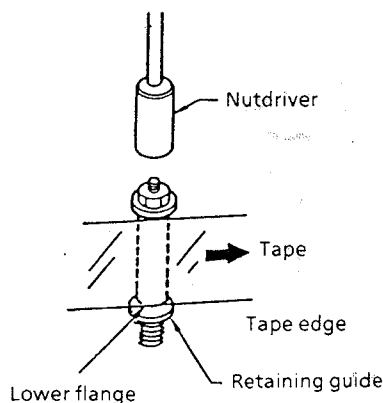


Figure 1-40.

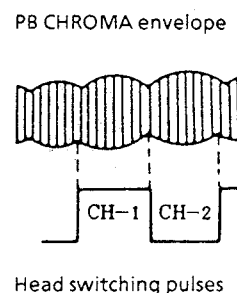


Figure 1-41.

6. Adjustment of A/C head and azimuth

- 1) Connect an oscilloscope to the audio out connector.
- 2) While playing back the 7 kHz audio portion (monoscope pattern for video signal) of the alignment tape, adjust the audio output to the maximum level by turning the azimuth adjusting screw.

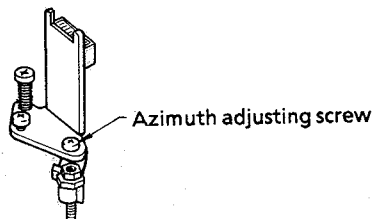


Figure 1-42.

- 3) While playing back the 1 kHz audio portion (color bar for video signal) of the alignment tape, adjust the audio output waveform to the maximum level by slowly turning the A/C head adjusting nut with the A/C head adjusting nutdriver.

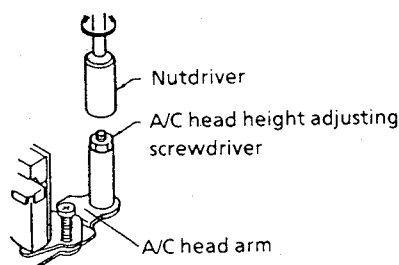


Figure 1-43.

- 4) Repeat the adjustment described in step 2) above.

- 5) After adjustment, apply locktite (adhesive) to the adjusting screws and nuts to fix them up.

7. Tape travel compatibility adjustment

- 1) Connect an oscilloscope to the PB CHROMA envelope output test point. An external trigger should be taken from the head switching pulse test point to the SYNC or EXT jack of the oscilloscope.

- 2) Play back the tape travel adjusting cassette tape.

- 3) Adjust the height of both the supply and take-up side guide rollers with the adjusting screwdriver so that the envelopes vary in the form of almost flat lines when the [+] and [-] tracking buttons are pressed.

- 4) If the tape is located above or below the helical lead of the head, the PB CHROMA envelope will take the shape as shown in Fig. 1-44.

- 5) Adjust the envelope as flat as possible by the same procedure as step 5-5).

	Tape is located above helical lead.		Tape is located below helical lead.	
	Supply side	Take-up side	Supply side	Take-up side
Adjustment	Make the envelope flat by turning the supply side guide roller clockwise (downward).	Make the envelope flat by turning the take-up side guide roller clockwise (downward).	Turn the supply side guide roller counterclockwise so that the flange of the guide roller lifts the tape upward. Then, turn the supply side guide roller clockwise to make the envelope flat.	Turn the take-up side guide roller counterclockwise so that the flange of the guide roller lifts the tape upward. Then, turn the take-up side guide roller clockwise to make the envelope flat.

Figure 1-44.

- 6) While pressing the [+] and [-] tracking buttons, check that the envelopes vary in the form of almost flat lines.
- 7) Loosen the guide roller fixing screws in the unloading condition and fix the guide rollers.
- 8) Play back the tape travel adjusting cassette tape and check that the envelopes do not fluctuate.

8. Adjustment of A/C head X-position

- 1) Press the [+] and [-] tracking buttons simultaneously to set the tape transport in the preset condition.
- 2) Adjust the X-position of the A/C head by turning the X-position adjusting nut with the special nut-driver so that the envelope of the low-channel head switching pulses becomes the maximum level.
- 3) Adjust the playback switching point.
- 4) Play back the self-recorded video tape to check the flatness of the envelopes and the audio output quality.

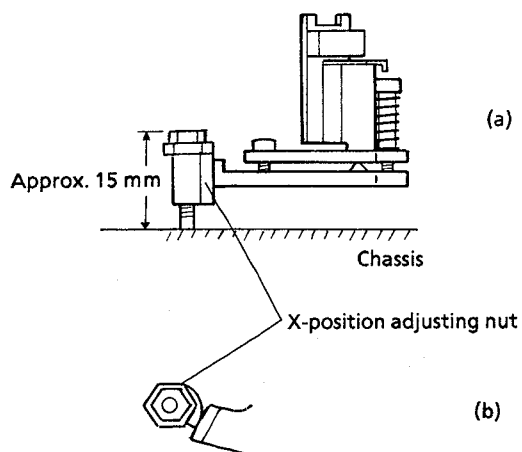


Figure 1-45.

Check that the X-position adjusting nut contacts with the A/C head arm at the approximate center of the cam as shown in Figure 1-45(b).

● REPLACEMENT OF CAPSTAN DIRECT DRIVE (DD) MOTOR

1. Remove the cassette housing.
2. Remove the chassis out of the cabinet frame.

Removal (Remove parts in the order of step numbers shown below.)

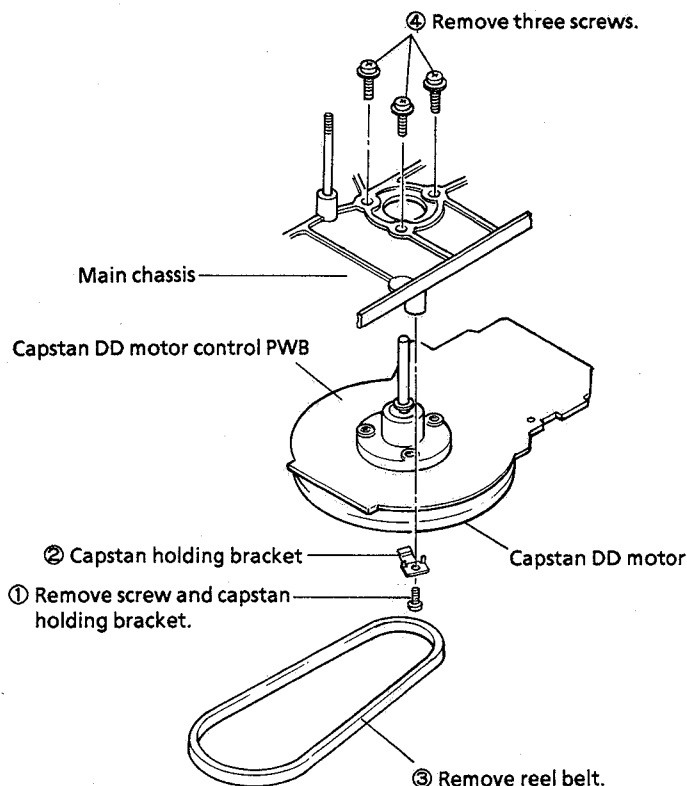


Figure 1-46.

Reassembly

- 1) Place the capstan shaft in position onto the chassis with care not to allow it to hit against the chassis and any surrounding mechanism. Then, fix with the three screws.
- 2) Insert the FFC into the connector on the capstan DD motor control PWB.
- 3) Fit the reel belt.

Notes:

1. After installing the capstan DD motor, be sure to check that it is located in the right position by turning the capstan.
2. Also perform check and adjustment of the servo circuit.

● DISASSEMBLY AND REASSEMBLY OF LOADING GEAR SECTION

1. Remove the cassette housing.
2. Remove the chassis from the cabinet frame.
3. Remove the reel belt.
4. Remove the reel block.

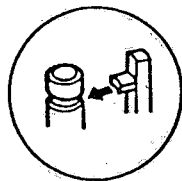


Figure 1-47.

Shafts of supply and take-up loading gears are retained by hooks as shown in Figure 1-47. Take care not to deform any of these parts.

Disassembly (Disassemble in the order of step numbers shown below.)

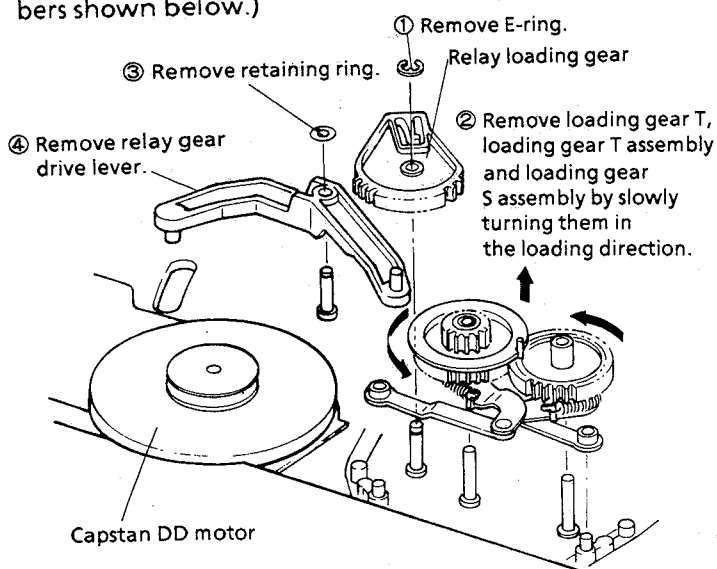


Figure 1-48.

It is a good idea to fix guide roller with elastic band or the like before removing loading gear to ease reassembly.

Reassembly

Reassemble the loading gear section in the reverse order of the disassembling procedure. Be sure to align the matchmarks when reassembling.

(Matching gears when reassembling)

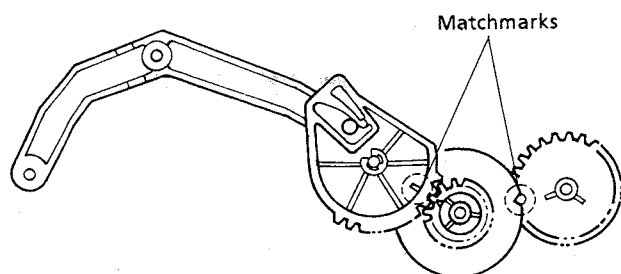


Figure 1-49.

Notes:

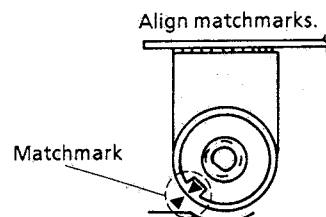
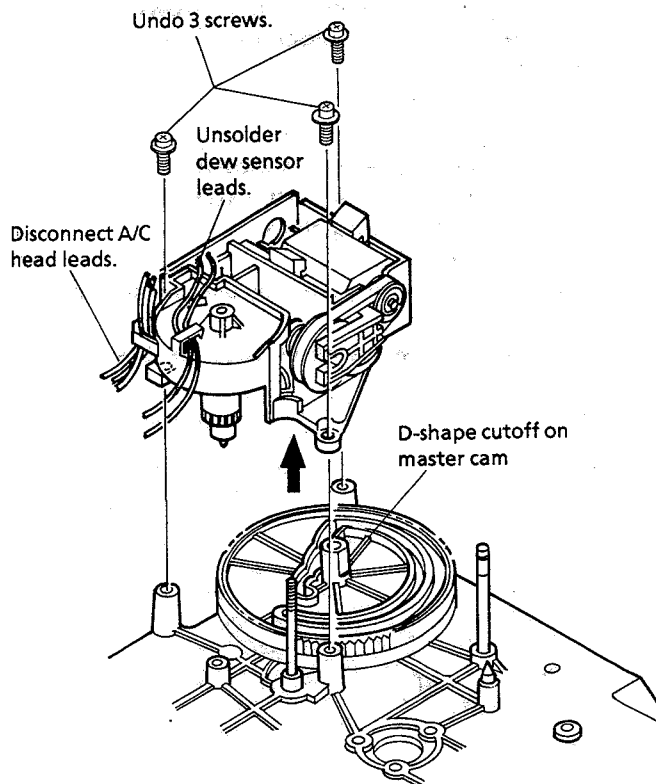
1. Before reassembly, apply specified grease to all the gear teeth and shafts as well as the relay loading gear's cam groove where the relay loading gear drive pin fits.
2. Be careful not to deform the supply and take-up loading arms.
3. Be careful to keep the outer surface of the capstan DD motor free from any dirt and dust. (Otherwise, failure of the MR (Magnet Resistor) element may result.)
4. Be careful not to reshape the slow acting brake or the retaining hooks of the supply and take-up loading gears too much.

● DISASSEMBLY AND REASSEMBLY OF LOADING BLOCK

1. Remove the three screws.
2. Remove the loading block by lifting it upward.

Note:

When using a magnetic screwdriver for removing the three screws, be careful not to allow it to come into contact with the drum.



When mounting L-block, first align cam switch as shown above, then insert it into master cam. (Make sure cam switch can be inserted smoothly.)

Figure 1-50.

Reassembly

1. Turn the master cam fully counterclockwise.
2. Align the matchmark of the cam switch with that of the L-block holder. Then, mate the loading block with the master cam and fix them by fastening the three screws.
3. Solder the dew sensor leads.

Notes:

1. Be careful not to damage the gear.
2. Be careful not to put any dirt on the belt. Clean it if it is dirty.

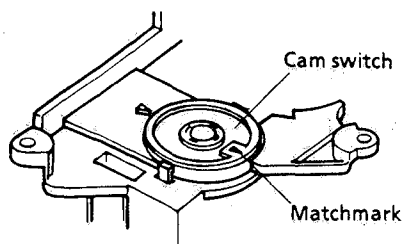


Figure 1-51.

● REPLACEMENT OF LOADING MOTOR

1. Unplug the power cord from the power outlet.
2. Remove the loading block referring to see page 39.

Removal

1. Unsolder two solder joints shown above.
2. Unlock the right and left catches of the cam switch off the loading block.
3. Take off the belt.
4. Take off the motor pulley by using a screwdriver or the like.
5. Unscrew the two screws that fix the loading motor.

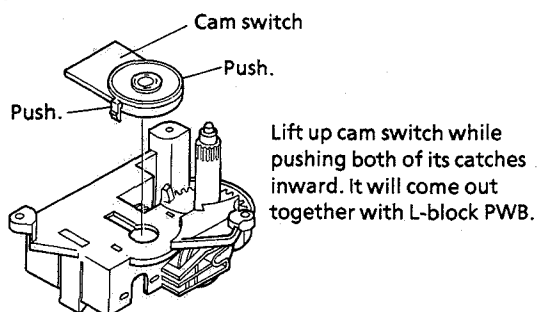
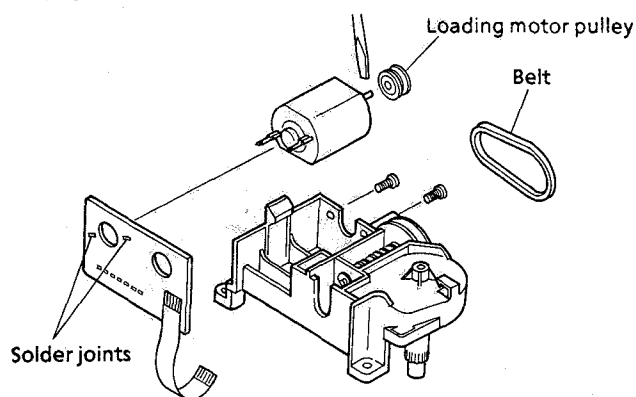


Figure 1-52.

Reassembly

1. Remove the existing loading motor and fit a new one as illustrated with its nameplate directed upward.
2. Fix the loading motor by tightening the screws.
3. Press-fit the pulley.
4. Fit the L-block PWB and cam switch.
5. Solder the leads of the loading motor.
6. Mount the loading block by the same procedure as described in see page 39.
7. Fit the belt.

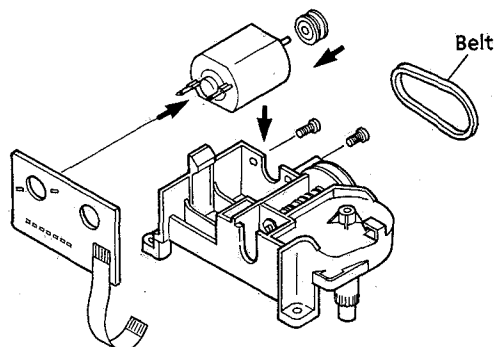
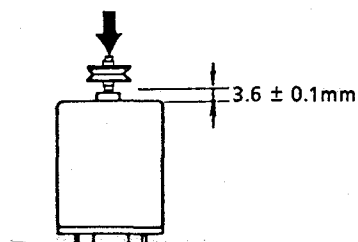


Figure 1-53.



Press-fit loading motor pulley at a force of 5 kg or less leaving a clearance of 3.6 ± 0.1 mm between motor and pulley.

Figure 1-54.

● REPLACEMENT OF MASTER CAM

Removal (Remove parts in the order of step numbers shown below.)

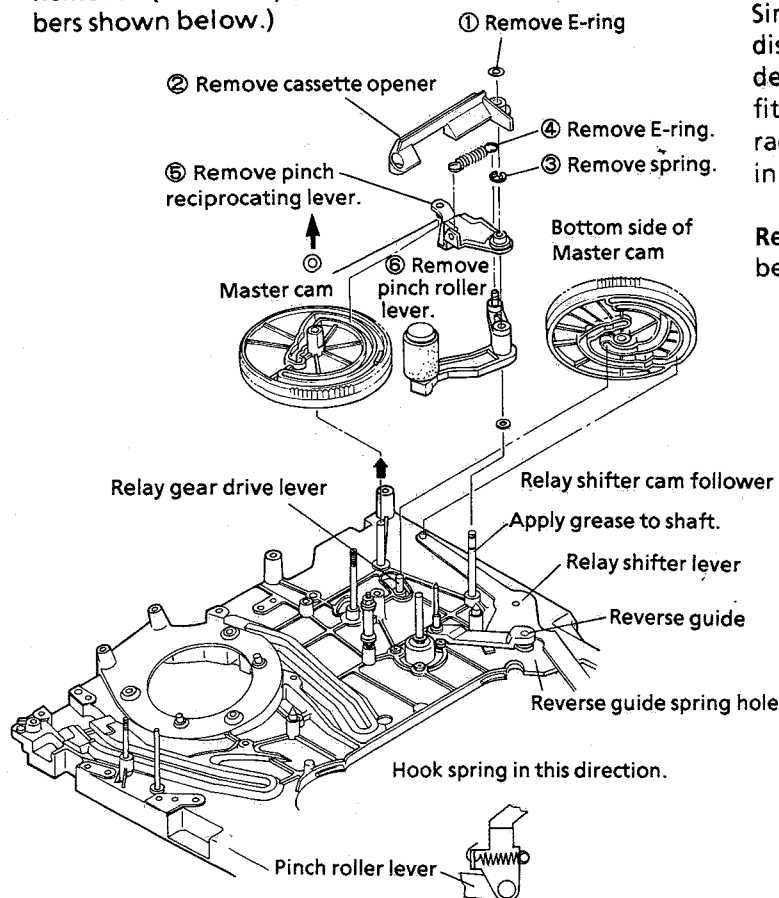


Figure 1-55.

Reassembly

1. Set the relay gear drive lever to the unloading condition.
2. Align the relay shifter with the reverse guide spring hole and set the master cam so that its cutoff side faces the direction of arrow.
3. Fit the pinch roller lever.
4. Rotate the master cam slightly clockwise so that the pinch reciprocating lever's cam pin fits into the cam groove. Then, fit the E-ring and the pinch roller lever.
5. Rotate the master cam by hand and make sure the three levers (relay gear drive lever, pinch roller lever and relay shifter) are set exactly in the cam grooves.
6. Fit the loading block according to see page 39.

Notes:

1. Be careful not to damage the tooth surface and cam grooves.
2. After installing the master cam, be sure to check that it is set in the right position by rotating it by hand before installing the loading block. The master cam and levers may be damaged if the motor is rotated with any of the levers set in a wrong position.
3. Apply grease to the cam grooves and tooth surface of the master cam.

● REPLACEMENT OF DRUMS

Note:

Since the clearance between the exterior of the disk and the interior of the upper drum is in the order of microns, scratches and dust can make their fitting difficult or adversely affect their fitting accuracy. Utmost care should be exercised to avoid this in their handling.

Removal (Remove parts in the order of step numbers shown below.)

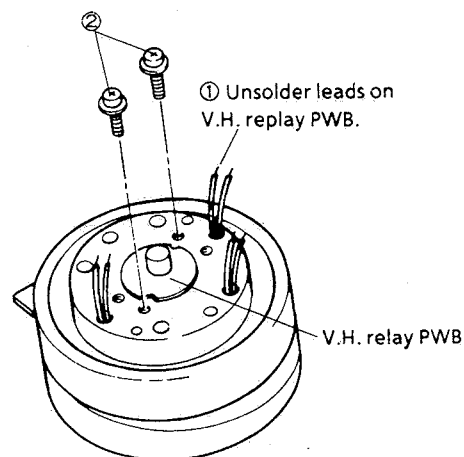
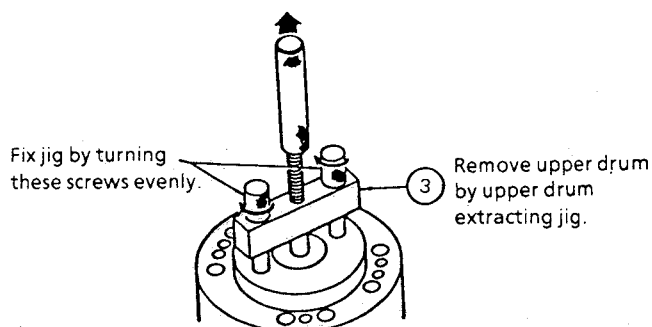


Figure 1-56.



Notes:

1. Do not put your finger direct on the drum surface.
2. Do not tilt the upper drum when lifting it up. Replace it with care to prevent any scratches on its inner circumference by using the upper drum extracting jig.
3. Do not force the screwdriver tight against the screws.

Reassembly

1. Install the replacement drum.
2. Solder individual leads to their correct positions.

Notes:

1. Make sure there is no scratch or dirt on the top surface and outer circumference of the disk before reassembly.
2. Make sure there is no scratch or dirt on the bottom surface and inner circumference of the upper drum before reassembly.
3. Fit the upper drum on the disk slowly and carefully in the exact vertical position.
4. Make sure there is no dust or dirt between the disk and upper drum when reassembling them.
5. Slowly place the tip of the screwdriver on the screw head and tighten it with care.
 - 1) Fix the upper drum with two fixing screws.
 - 2) Finish soldering quickly. Be careful not to touch the adjacent conductor traces with the soldering iron.
 - 3) After replacing the drums, be sure to perform a tape travel check and the following adjustments:
 - Adjustment of playback switching point
 - X-position adjustment
 - Tracking speed preset adjustment in normal speed, triple speed and slow modes.

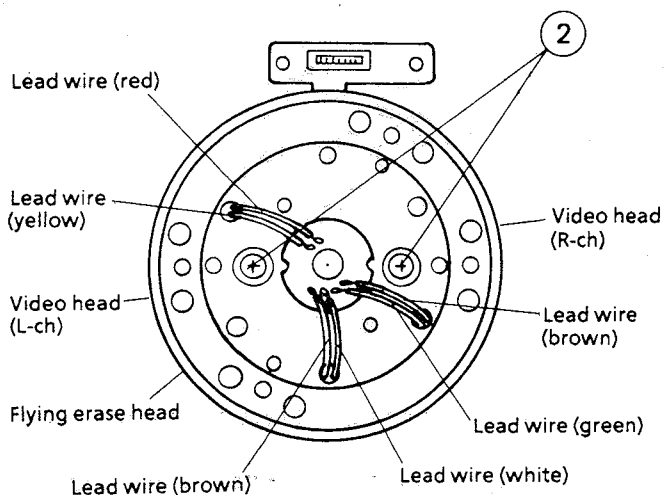


Figure 1-57.

● REPLACEMENT OF DIRECT DRIVE (DD) MOTOR

1. Select the eject mode.
2. Unplug the power cord from the power outlet.

Removal (Remove parts in the order of step numbers shown below and reassemble in the reverse order.)

1. Disconnect the FFC.
2. Unscrew the earth brush fixing screw with a nut-driver.
3. Remove the earth brush assembly.
4. Remove the DD rotor assembly fixing screws.
5. Remove the dynamic vibration absorber assembly.
6. Take off the DD rotor assembly.
7. Unscrew the DD stator assembly fixing screws.
8. Remove the DD stator assembly.
 - 1) When removing the DD rotor assembly and DD stator assembly, take care not to let them touch the intermediate loading gear.
 - 2) When assembling the DD rotor assembly and lower drum, align the direction of their mounting direction reference holes.

Notes:

1. Be careful not to damage the upper drum and video head.
2. Do not give a strong shock to the Hall element, DD stator assembly, DD rotor assembly, or any other surrounding parts.
3. Adjust the playback switching point after reassembly.

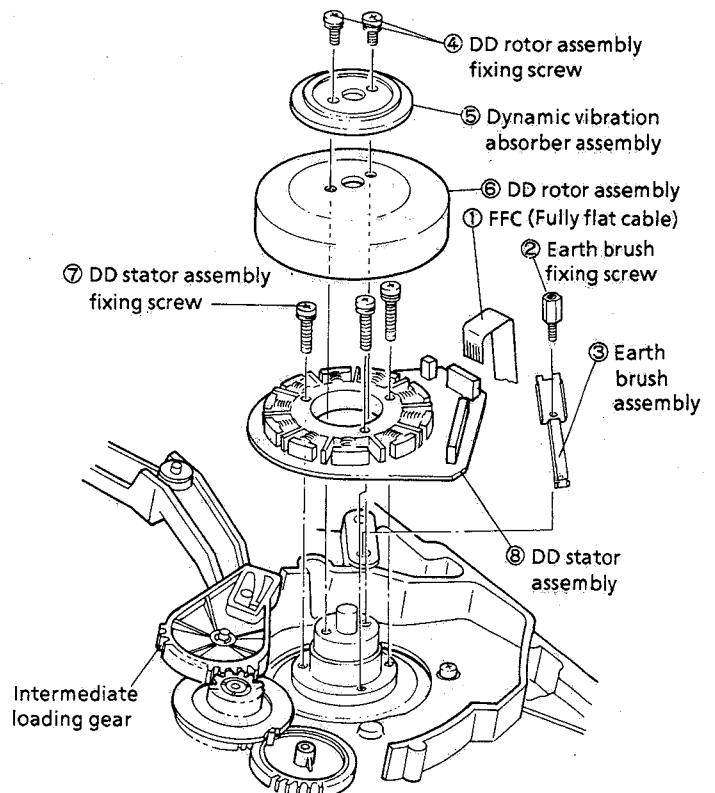


Figure 1-58.

ADJUSTMENT OF ELECTRICAL CIRCUIT

ADJUSTMENT OF CAMERA SECTION

1. Service for Camera Section

1) Servicing Method

The following extension cords are required in performing PWB repair and re – adjustment of camera section.

Parts code	Connection point	Connector name
QCNW – 1095TAZZ	Camera section process board ↔ Video section Y/C board (pin 4)	MF(P401) ↔ AM(P13)
QCNW – 1094TAZZ	Camera section A/F board ↔ Video section power source unit (pin 8)	FB(P709) ↔ AP(P10)
QCNW – 1093TAZZ	Camera section process board ↔ Video section main board (pin 11)	ME(P701) ↔ AN(P14)
QCNW – 1096TAZZ	Camera section A/F board ↔ Camera operating board (pin 14)	FA(S701) ↔ CA(S001)
QCNW – 1092TAZZ	A/F board ↔ Lens unit (pin 18)	FE(P601) ↔ Lens
QCNW – 1091TAZZ	Process board ↔ A/F board (pin 20)	MC(P703) ↔ FC(P705)
QCNW – 1090TAZZ	Process board ↔ A/F board (pin 30)	MD(P704) ↔ FD(P706)

When mounting the camera section on the tripod, use special table (JIGSTAND-L310) and attach it to the lens holder of camera section as shown in the figure below.

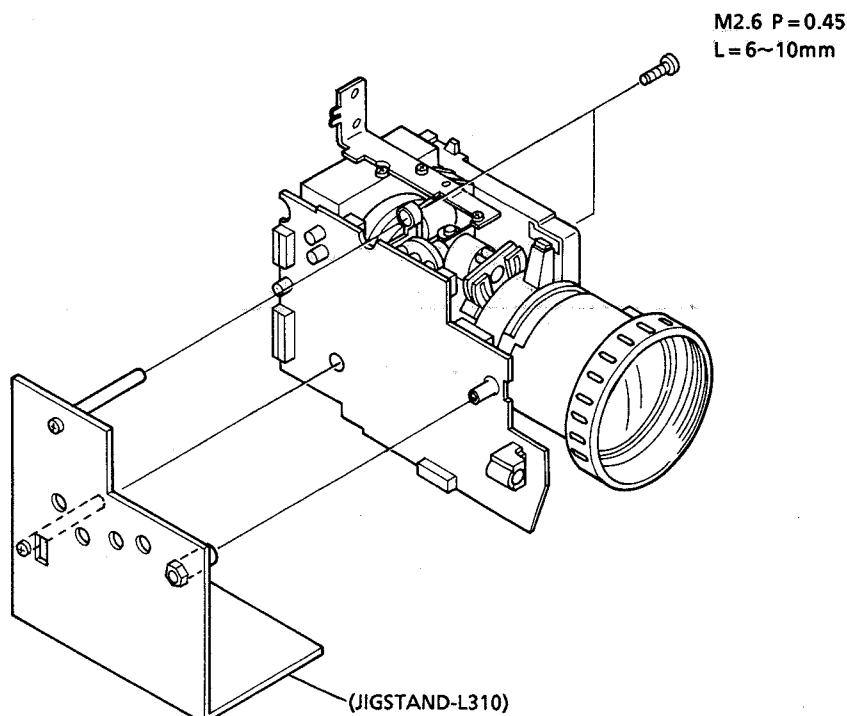


Figure 2-1.

2. CCD Sensor Replacement

• Before replacement

1) The CCD image sensor has weaker characteristic than C-MOS LSI against the damage caused by static electricity. Therefore, Electro-static Damage Prevention Technique must thoroughly be carried out at replacement.

- The soldering iron must be grounded.
- Human body must also be grounded by wearing the wrist strap (via 1 MΩ resistor).
- The CCD sensor must be put into the conductive sponge for its foot lead to be shorted until it is fixed on the board.

2) Take good care not to stick any stain, dust or scar on the surface glass or optical filter of CCD sensor. If any stain such as fingerprints sticks, wipe it off with silicon paper or clean chamois.

3) When replacing the CCD sensor, use the soldering iron with protection against static electricity and make soldering within a very short time.

4) Before installing the CCD sensor, read the indicated value of OFD voltage shown on the back of CCD sensor and put it down on a note, etc. As for OFD voltage adjustment, see item 2 of adjustment procedure.

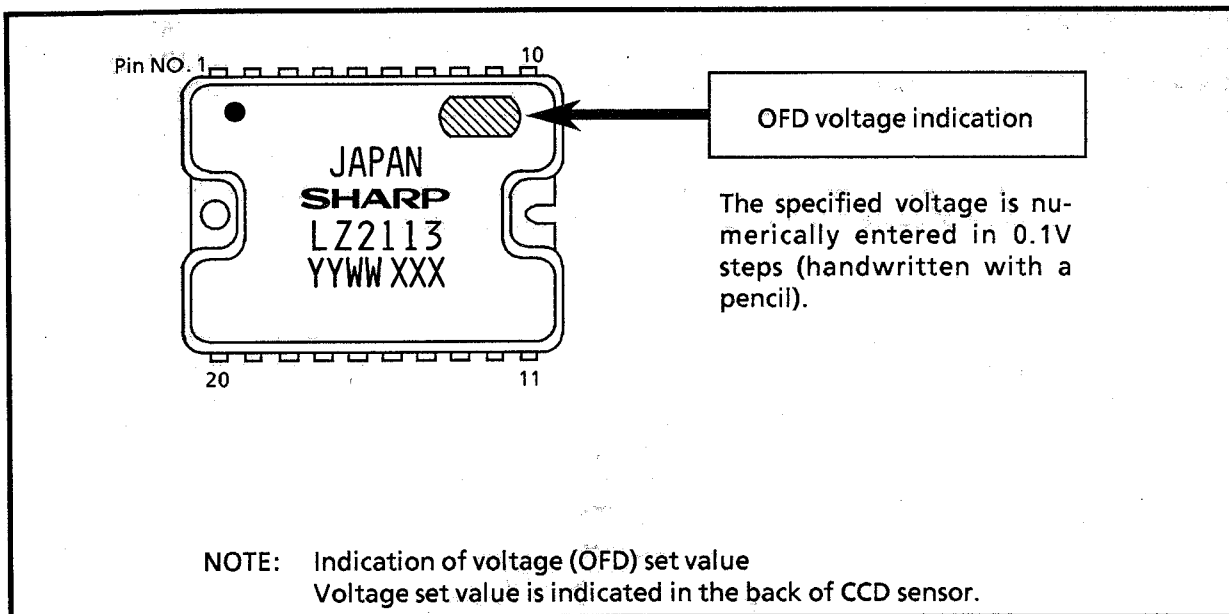


Figure 2-2.

● DISASSEMBLY OF THE LENS UNIT

● Camera main PWB removal

- 1) Remove the two set-screws ① and separate the connector and the auto focus PWB from each other.

● Camera operation PWB removal

- 1) Detach the hooks of the PWB holder and lift the PWB upwards.

● PWB holder removal

- 1) Remove the two set-screws ② and detach the V/F holder.
- 2) Remove the two set-screws ③ and slide the PWB holder backwards off the lens unit.

● Auto focus PWB removal

- 1) Remove the two set-screw ④ and separate the connector and the lens unit from each other.

● Replacing the CCD Sensor

★ Precautions before replacement

- 1) The CCD image sensor is more prone to electrostatic breakdown than C-MOS LSIs. It is therefore essential to take the following electrostatic breakdown preventive measures.

★ Ground a soldering iron.

★ Wear a wrist strap to ground yourself (with a 1-Mohm resistor in between).

★ Keep the CCD sensors stuck in an electro-conductive pad or sponge so that their legs and leads be held short-circuited until they are fixed on the PWB.

- 2) Take good care not to stain or scratch the surface glass or optical filter of the CCD sensor. If they are stained with fingerprint, for example, wipe them clean with silicon paper or clean chamois.

- 3) Use the soldering iron with anti-static protection as well as being grounded. Carry out the soldering in as short time as possible.

● Removing the CCD sensor

- 1) Remove the four set-screws ⑤ and detach the shielding case.

- 2) Remove the two screws ⑥ and separate the lens and the sensor PWB unit from each other.

- 3) Unsolder the CCD sensor and draw it out of the PWB. Then remove the two screws ⑦ to separate the sensor PWB from the CCD holder.

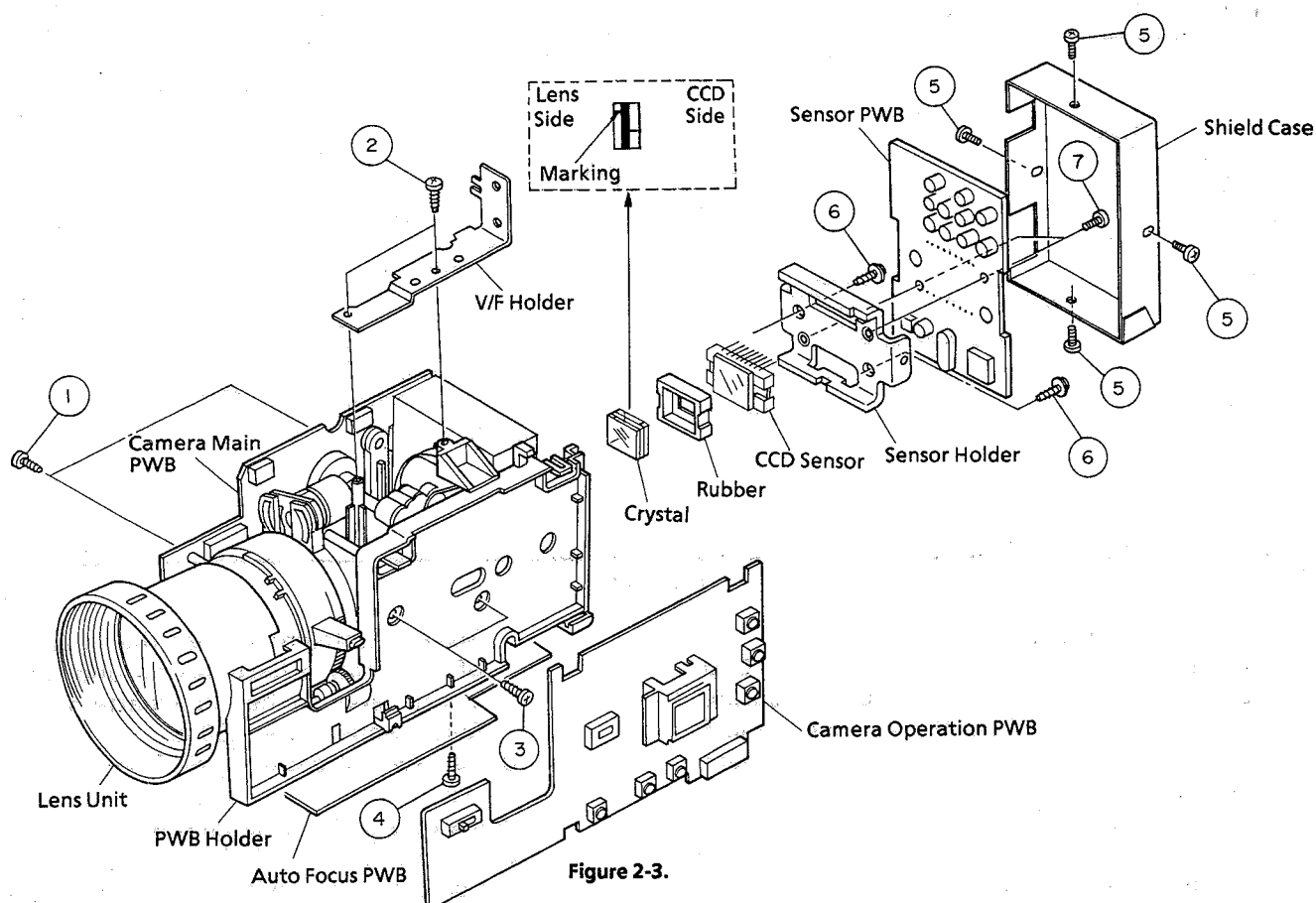


Figure 2-3.

● Fixing the CCD Sensor

- 1) Mount the crystal and the dust-proof rubber on the lens. Fit the CCD sensor (peel the protective sheet, if any, off the CCD sensor) so that its hole and notch come onto the two round pins on the lens. Do not confuse the positional relation between the CCD sensor and the sensor PWB. The marking on the crystal should face forward (towards the lens).

- 2) Fix the CCD holder to the lens in the proper direction with the two screws ⑥.
- 3) Carefully put the pin of the CCD sensor, protruding from the CCD holder, into the sensor PWB. Now fix the sensor PWB with the two screws ⑦.
- 4) Solder the CCD sensor pin to the sensor PWB. At this time, be careful not to apply any excessive heat.

3. Adjustment of Camera

1) Object, Meter and Jig necessities for Camera Adjustment.

- | | | |
|-----------------------|---|---------------------------------------|
| ● Gray scale | ● White pattern | ● AV output cable |
| ● Color bar chart | ● Siemens star | ● Color temperature conversion filter |
| ● Oscilloscope | ● Frequency counter | Cold conversion |
| ● Digital voltmeter | ● Vectorscope | HOYA "LB165" |
| ● Illuminometer | ● Color temperature meter | Hot conversion (W12) |
| ● Color video monitor | ● Tripod fixing jig | ● Halogen light (2 pcs.) |
| ● Extension cable | ● DC power supply 12V
(AC adaptor, etc.) | |

2) Standard Connection at Camera Adjustment

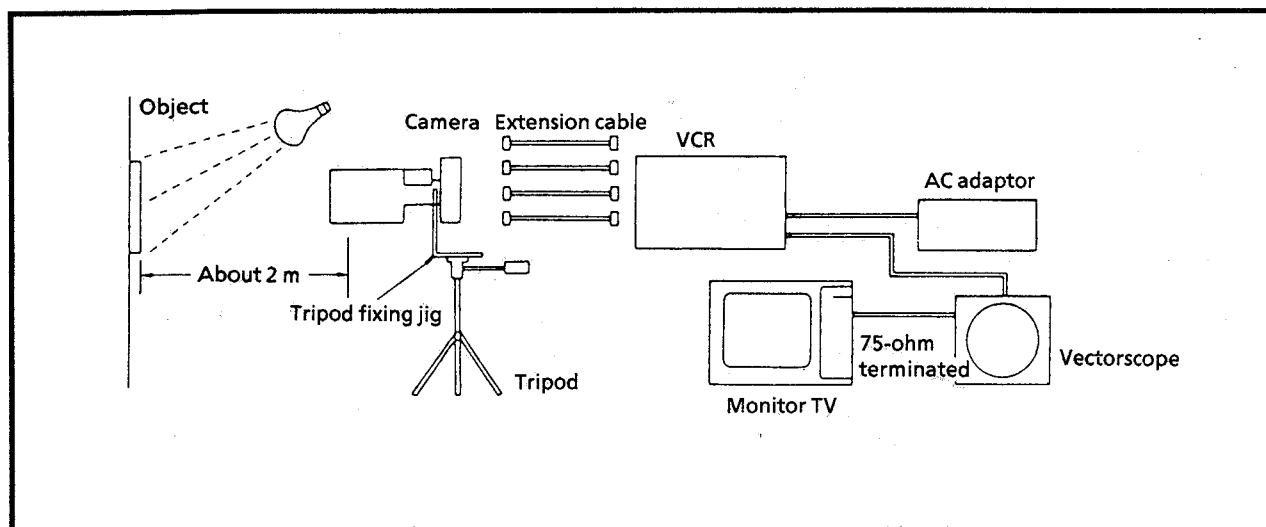


Figure 2-4.

When adjusting the camera section:

For sensor board adjustment or repair, CCD replacement or lens replacement, separate the camera section from the VCR section and connect them with an extension cable. Mount the camera section on the tripod with the tripod fixing jig.

3) Preparation before Adjustment and Checking

[1] Illumination

Intensity of illumination:

Make adjustment so that the intensity of illumination becomes around 3000 Lux and even on the whole pattern.

Color temperature 3200°k.

- [2] Use a new test pattern free from blemish or dye.
- [3] In the case when something wrong occurs with the electric circuit, be sure to find out the defective part with meter and make adjustment after repairing or replacing it. Do not move any adjusting control unnecessarily without finding out the defective part.

[4] Micro computer is used for main adjustments in this unit.

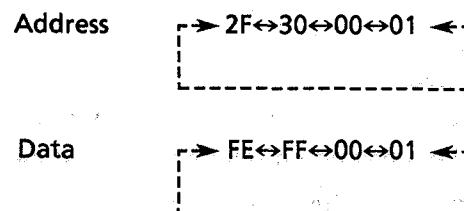
To perform adjustment, it is necessary to short between pins 2 (TEST IN 2) and 1 (GND) of VCR main PWB AT connector

(TEST 1) using a resistor of 1.2 k Ω and set in camera adjustment mode.

After adjustment is completed, be sure to remove the resistor.

No	Adjustment procedure	View finder screen display ( is flashing)
1	Rewrite the figure flashing on the screen by using FF and REW keys to select the item (address) to be adjusted.	ADJ 
2	Press PB key to call the data of the specified address.	ADJ 30 FF
3	Make adjustment by rewriting the data with FF and REW keys. (When the data is rewritten, the display starts flashing.)	ADJ 30 
4	Press PB key to write the data in the specified address, by which adjustment is completed. (Data display stops flashing.)	ADJ 30 00
5	If STOP key is pressed in the state of No.2 or 4, the unit returns to the state of No.1, where the item (address) to be adjusted can be selected.	ADJ 

If pressed for 0.3 sec. or more, FF and REW keys perform repeat operation. At data setting, if pressed for another 2 sec. or more, these keys rewrite the data by ± 4 . Address and data are displayed in hexadecimal. The selecting order is as follows:



Address and data are displayed on the DATE-TIME display portion of the view finder.

Items (addresses) to be adjusted are as follows:

CH01	Iris Level	CH11	White Balance Mode
CH02	ACG Level	CH12	R Offset
CH03	Black Clip	CH13	B Offset
CH04	Red/White Balance	CH14	R Gain
CH05	Blue/White Balance	CH15	B Gain
CH06	R-Y Gain	CH16	B-Y Carrier Balance
CH07	B-Y Gain	CH17	R-Y Carrier Balance
CH08	R-Y Matrix	CH18	PAL Burst
CH09	B-Y Matrix	CH19	Burst Phase
CH0A	R-Pedestal Correction	CH1A	Highlight Chroma Suppression
CH0B	Color Difference between 2H Offset Correction	CH1B	B-Y level
CH0C	Hall Offset	CH1C	R-Y level
CH00	Initialize	CH30	Back Light Correction

The following are free addresses having no relation to adjustment.

CH0D, CH0E, CH0F
CH10, CH1D, CH1E, CH1F
CH20~CH2F

(CAUTION)

- In adjustment mode, take care not to touch the keys having no relation to adjustment. If it becomes impossible to read or rewrite the data, cancel adjustment mode and turn DC power supply ON once more, and then set in adjustment mode again.
- If the data of Back Light Correction (CH30) is rewritten into the ones other than 00, the unit is set in Back Light Correction mode. As the camera operating switch (except Green Lock) becomes ineffective in adjustment mode, this address should be used at High Luminance Color Suppression Adjustment.

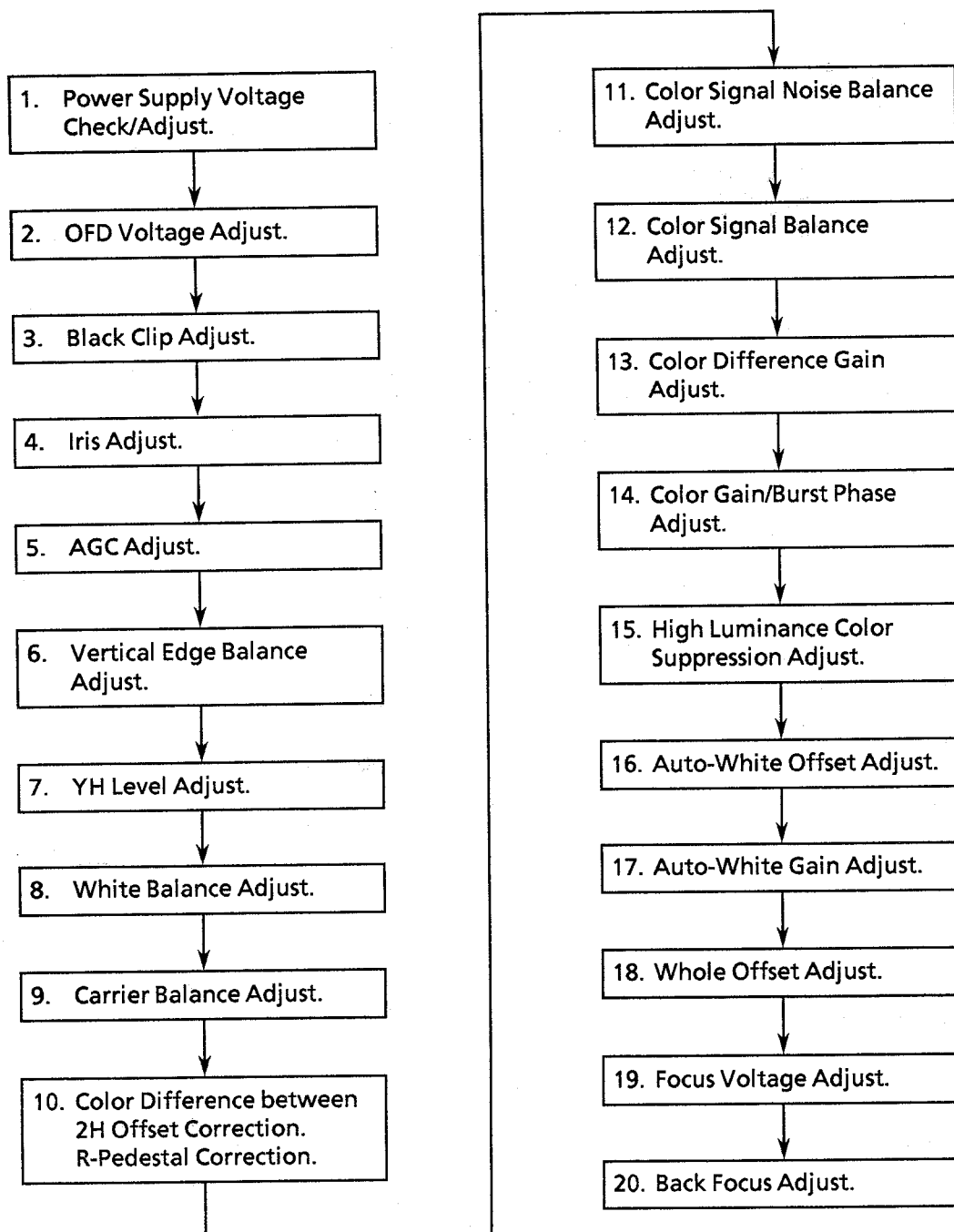
- White balance is set to the following modes by the data of White Balance Mode (CH11).

White Balance Data	White Balance Mode
1E (00~3B)	Auto White
7F (6B~93)	Indoor
D8 (C4~ED)	Outdoor

- In the case when E²PROM (IC653; BR93C46F) is replaced, the data of Initialize (CH00) should be rewritten into the ones other than FF. (The microcomputer is so set that all outputs of D/A become 7F when the data in Initialize is FF.)

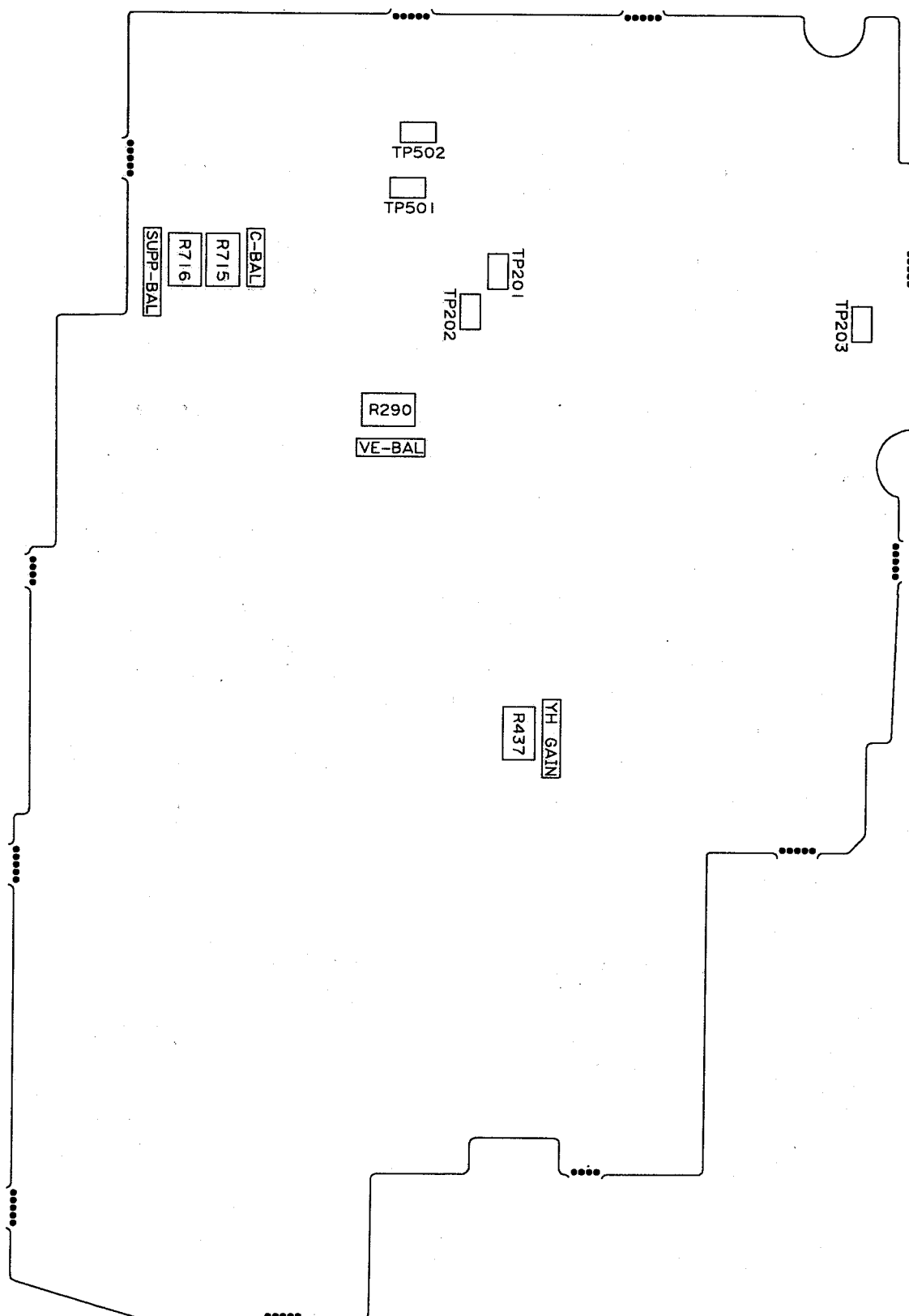
- [5] **Camera Adjustment Procedure**
This adjustment procedure indicates the order necessary for following all adjustments in case of replacement of CCD, etc.

Therefore, some items may be unnecessary to adjust according to the cases.

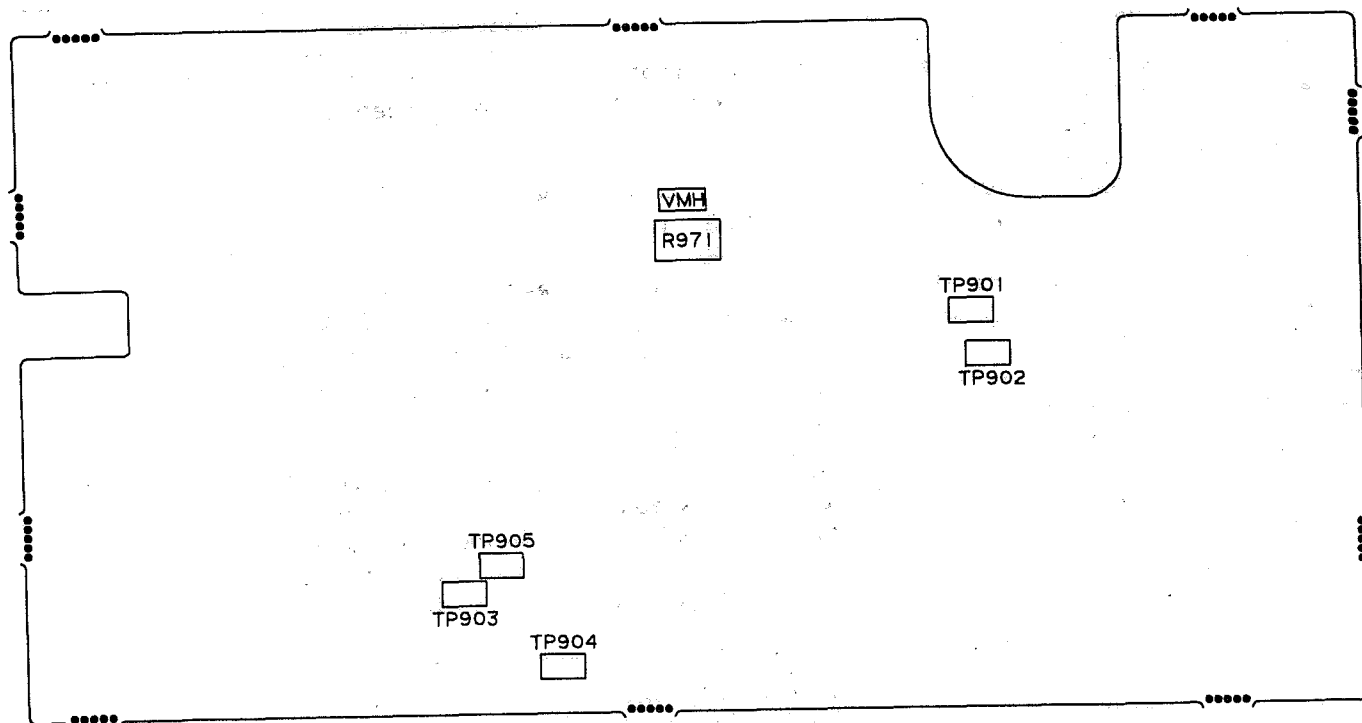


Location of Test Points and Controls

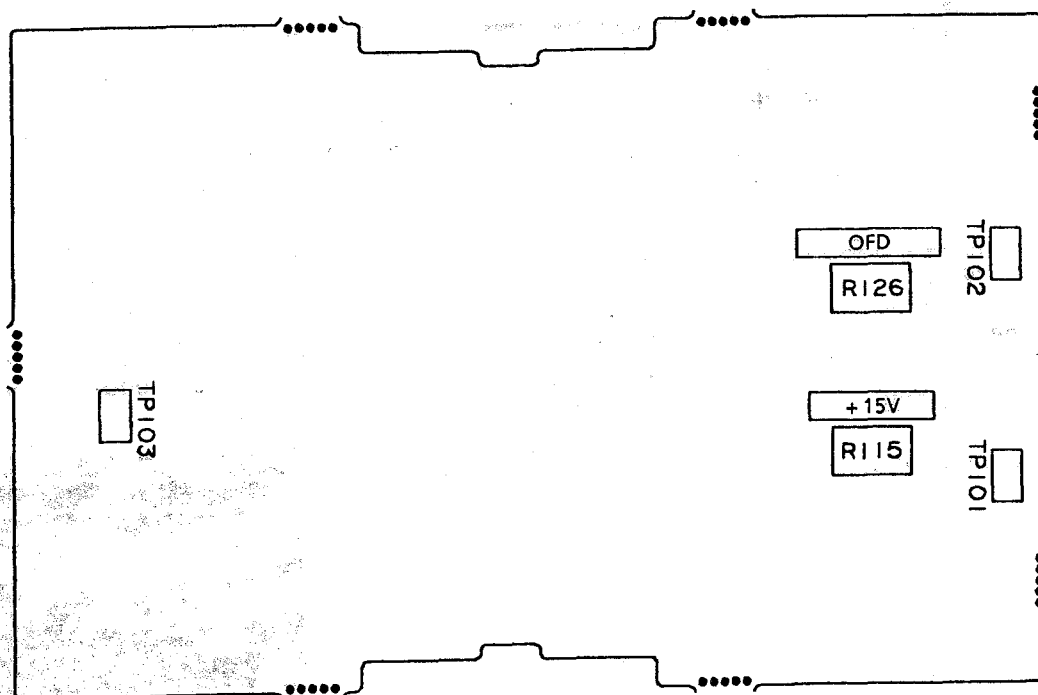
- Camera Main Circuit



• Auto Focus Circuit

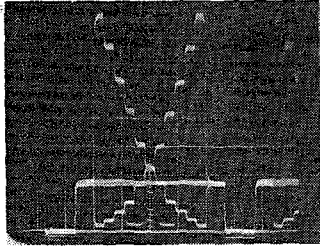
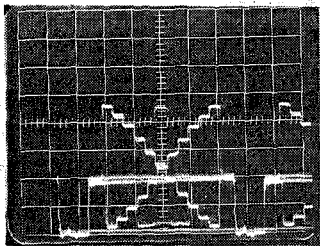
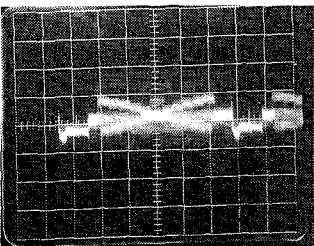
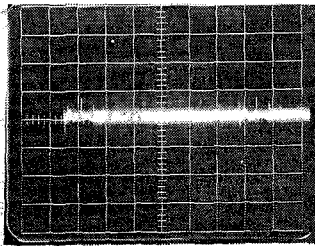


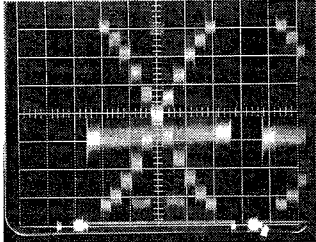
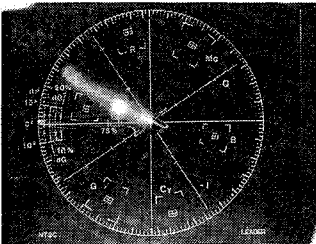
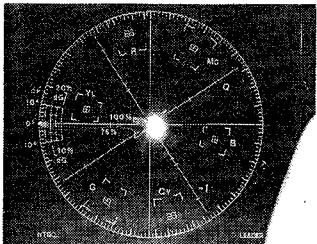
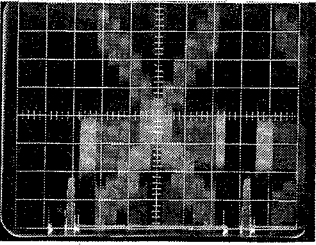
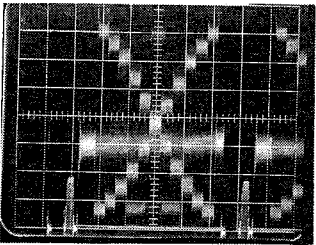
• Sensor Circuit

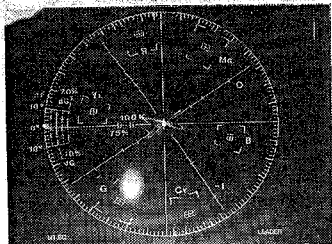
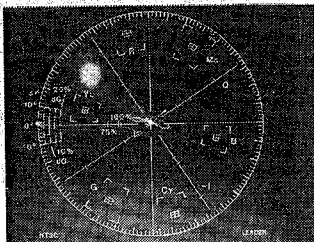
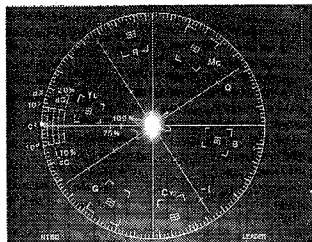
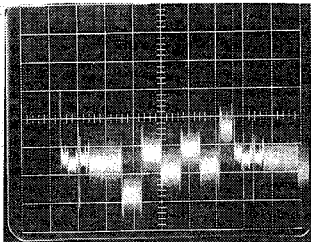
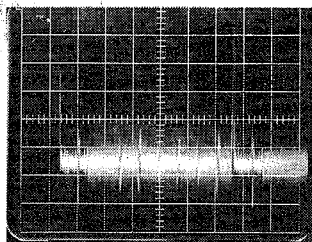
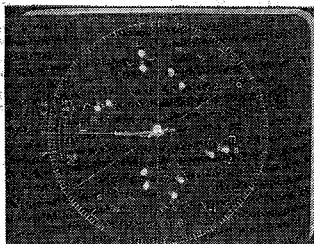
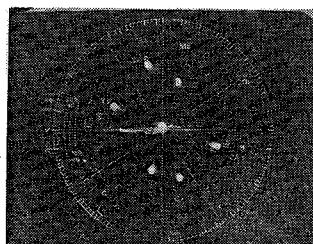


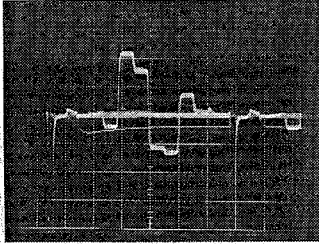
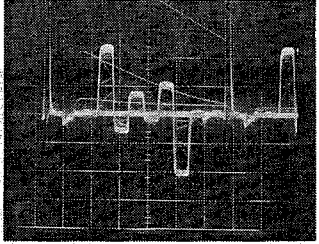
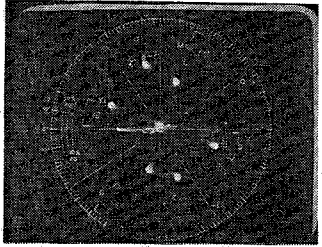
4. Adjustment procedure

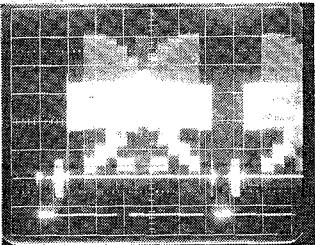
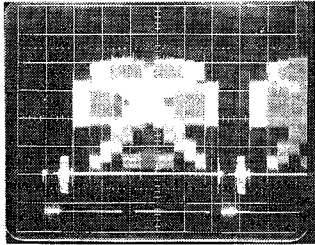
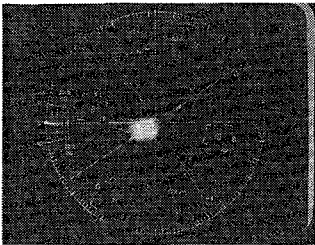
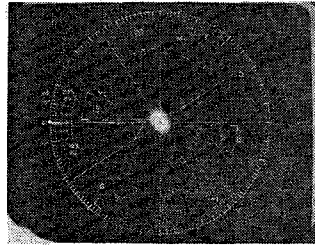
Item	Adjusting method
1. Power Voltage Check/Adjustment - Terminal P709 ① (−13V) P709 ② (+17V) P709 ③ (+5V) P709 ④ (+9V) P709 ⑦ (12V) - Place R115 (15V Adjustment) - Meter Digital voltmeter (DGVM)	1) Check voltage at each terminal of P709 connector on the auto focus board. (Take care not to short between terminals.) P709 ① −13.1 ± 1.0V −4.0V P709 ② +16.7 ± 0.8V P709 ③ +5.1 ± 0.1V P709 ④ +9.0 ± 0.1V P709 ⑦ 12V (NON-REG, 10.8~14.5V) 2) Observe TP101 with DGVM and adjust R115 so that 15.0 ± 0.05V is obtained.
2. OFD Voltage Adjustment	
CAUTION: This adjustment is performed for each CCD sensor. Accordingly, make this adjustment only when the CCD sensor is replaced. If R126 is turned by mistake, remove the sensor board from the CCD sensor, read the indicated value of OFD voltage shown in the back of CCD sensor, and then install the sensor board on the CCD sensor, after which make adjustment according to the following procedure.	
- Terminal TP102 (OFD) - Place R126 (OFD adjustment) - Meter Digital voltmeter	1) Observe TP102 with DGVM and adjust R126 so that (Voltage indicated on the back of CCD sensor) ± 0.1V is obtained.
OFD Voltage Reading The specified voltage is numerically entered in 0.1V steps (handwritten with a pencil).	
3. Black Clip Adjustment - Terminal MG (P702) ② (Y) - Address CH03 Black clip - Meter Oscilloscope (Horizontal cycle)	1) With lens capped, observe pin ② of MG (P702). Rewrite the data of CH03 so that scan time and flyback time become equal to each other. 50 mV/div 10 μsec/div

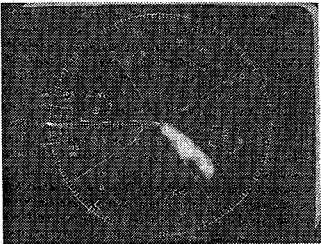
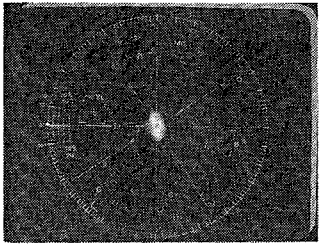
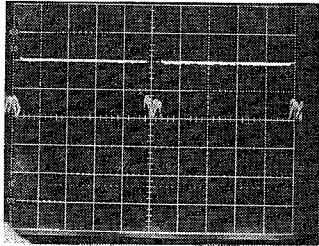
Item	Adjusting method
4. Iris Adjustment ● Terminal MG (P702) ① (YC) ● Address CH01 <u>Iris level</u> ● Meter Oscilloscope (Horizontal cycle) ● Object Gray scale	1) Projecting gray scale in standard condition, observe pin ① of MG (P702) with oscilloscope. Rewrite the data of CH01 so that amplitude becomes <u>380 ± 15 mVp-p</u>.  50 mV/div 10 μsec/div
5. AGC Adjustment ● Terminal MG (P702) ② (Y) ● Address CH02 <u>AGC level</u> ● Meter Oscilloscope (Horizontal cycle) ● Object Gray scale	1) Projecting gray scale in standard condition, observe pin ② of MG (P702) with oscilloscope. Rewrite the data of CH02 so that amplitude becomes <u>450 ± 15 mVp-p</u>.  100 mV/div 10 μsec/div
6. Vertical Edge Balance Adjustment ● Terminal TP203 (Vertical contour) ● Address R290 Vertical edge balance ● Meter Oscilloscope (Horizontal cycle) ● Object Gray scale	1) Projecting gray scale in standard condition, observe TP203 with oscilloscope. Adjust R290 so that wave form leakage is minimized.  50 mV/div 10 μsec/div Incomplete adjustment  50 mV/div 10 μsec/div Optimum adjustment

Item	Adjusting method
7. YH Level Adjustment - Terminal MG (P702) ⑤ (CAM-Y) - Place R437 <u>YH level</u> - Meter Oscilloscope (Horizontal cycle) - Object Gray scale	1) Projecting gray scale in standard condition, observe pin ⑤ of MG (P702) with oscilloscope. Adjust R437 so that Y signal amplitude (not including synchronizing signal) becomes $710 \pm 20\text{mVp-p}$.  100 mV/div 10 μsec/div
8. White Balance - Terminal EE output - Address/ CH04 <u>Red/White balance</u> CH05 <u>Blue/White balance</u> - Meter Vectorscope - Object Gray scale CAUTION: Set the data of white balance mode (CH11) at 7F to set white balance in indoor mode.	1) Project gray scale in standard condition. By rewriting the data of CH04 and CH05, adjust white balance in 3200°K halogen luminous source so that the brightness point on vectorscope focuses becoming minimum.  EE output Example of incomplete adjustment  EE output Completed adjustment
9. Carrier Balance Adjustment - Terminal EE output MG (P702) ⑤ (CAM-Y) MG (P702) ⑦ (CAM-C) - Address CH17 <u>R-Y carrier balance</u> CH16 <u>B-Y carrier balance</u> - Meter Vectorscope Oscilloscope (Horizontal cycle) - Object Gray scale	1) Projecting gray scale in standard condition, make addition (1:1) of pins ⑤ and ⑦ of MG (P702) to obtain composite video signal. 2) Rewrite the data of CH16 and CH17 so that carrier leakage of gray scale black 1st gradation is minimized. 3) At this time, if carrier balance is dislocated with lens capped, make fine adjustment of it together with item 10.  100 mV/div 10 μsec/div Extremely dislocated adjustment  100 mV/div 10 μsec/div Optimum adjustment

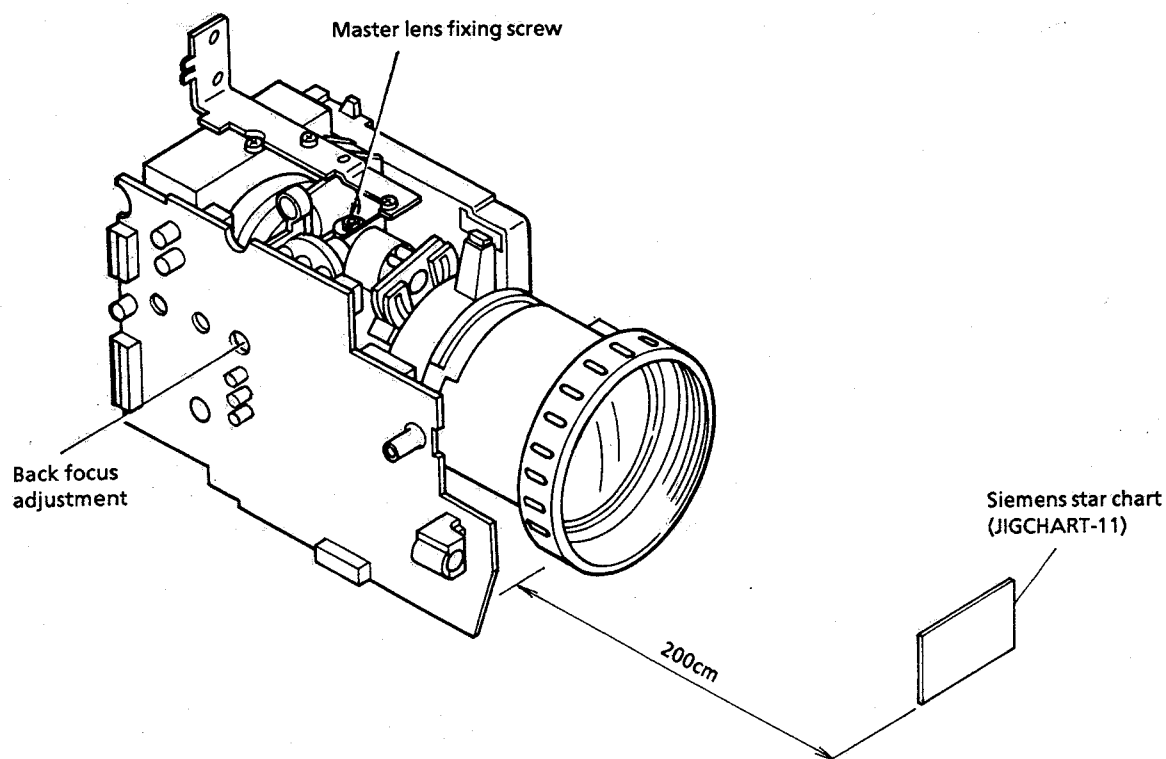
Item	Adjusting method
10. Color Difference between 2H Offset Correction, R-Pedestal Correction - Terminal EE output - Address CH0B <u>Color difference between 2H Offset Correction</u> - CH0A <u>R-Pedestal Correction</u> - Meter Vectorscope	1) With lens capped, rewrite the data of CH0A and CH0B by turns so that the bright point of vectorscope comes to the center. 2) At this time, if carrier balance is dislocated with gray scale projected in standard condition, adjust it repeatedly together with item 9.
 EE output Direction of shift of brightness point at CH0B data rewriting.	 EE output Direction of shift of brightness point at CH0A data rewriting.  EE output Completion of adjustment
11. Color Signal Noise Balance Adjustment - Terminal TP202 (CNR TP) - Place R716 - Color difference 0H, 2H level setting - Meter Oscilloscope (Horizontal cycle) - Object Color bar chart	1) Projecting color bar chart, observe TP202 with oscilloscope. Adjust R716 so that signal leakage is minimized.  100 mV/div 10 μsec/div Incomplete adjustment  100 mV/div 10 μsec/div Optimum adjustment
12. Color Signal Balance Adjustment - Terminal EE output - Place R715 <u>Color difference between H level setting</u> - Meter Vectorscope - Object Color bar chart	1) Projecting color bar chart, adjust R715 so that dispersion of brightness point of each color vanishes.  EE output Incomplete adjustment  EE output Optimum adjustment

Item	Adjusting method								
13. Color Difference Gain Adjustment ● Terminal MG (P702) ③ (R-Y) MG (P702) ④ (B-Y) ● Address CH06 <u>R-Y Gain</u> CH07 <u>B-Y Gain</u> ● Meter Oscilloscope (Horizontal cycle) ● Object Color bar chart	1) Projecting color bar chart, set the screen angle at 75%. 2) Observe pin ③ of MG (P702) connector with oscilloscope. Rewrite the data of CH06 so that amplitude of R-Y wave form becomes <u>$350 \pm 15 \text{ mVp-p}$</u>. 3) Observe pin ④ of MG (P702) connector with oscilloscope. Rewrite the data of CH07 so that amplitude of B-Y wave form becomes <u>$450 \pm 15 \text{ mVp-p}$</u>.  100 mV/div 10 $\mu\text{sec/div}$ R-Y wave form  100 mV/div 10 $\mu\text{sec/div}$ B-Y wave form								
14. Color Gain/Burst Phase Adjustment ● Terminal EE output ● Address CH1C <u>R-Y Level</u> CH1B <u>B-Y Level</u> CH19 <u>Burst Phase</u> CH08 <u>R-Y Matrix Correction</u>	1) Projecting color bar chart, set the screen angle at 75%. Check that 7F is written in the data of CH09 before adjusting. If it's not, rewrite it. 2) Rewrite the data of CH1C, CH1B, CH19 and CH08 so that the red and blue brightness points come to the marked position shown below. At this time, gain must be set at 75% amplitude point on B-Y axis with vectorscope.  EE output <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 40%;">Red phase</td> <td>$103^\circ \pm 3^\circ$</td> </tr> <tr> <td>Red amplitude</td> <td>1.5 ± 0.2 times (ratio to burst)</td> </tr> <tr> <td>Blue amplitude</td> <td>1.3 ± 0.2 times (ratio to burst)</td> </tr> <tr> <td>Blue phase</td> <td>$343^\circ \pm 5^\circ$</td> </tr> </table>	Red phase	$103^\circ \pm 3^\circ$	Red amplitude	1.5 ± 0.2 times (ratio to burst)	Blue amplitude	1.3 ± 0.2 times (ratio to burst)	Blue phase	$343^\circ \pm 5^\circ$
Red phase	$103^\circ \pm 3^\circ$								
Red amplitude	1.5 ± 0.2 times (ratio to burst)								
Blue amplitude	1.3 ± 0.2 times (ratio to burst)								
Blue phase	$343^\circ \pm 5^\circ$								

Item	Adjusting method
15. Highlight Chroma Suppression Adjustment ● Terminal MG (P702) ⑤ (CAM-Y) MG (P702) ⑦ (CAM-C) ● Address CH1A <u>Highlight Chroma Suppression</u> ● Meter Oscilloscope (Horizontal cycle) ● Object Gray scale	1) By using oscilloscope, make addition (1:1) of pins ⑤ and ⑦ of MG (P702) connector to obtain composite video signal. 2) Project gray scale with white balance fixed in indoor mode. 3) Attach color temperature conversion filter (W12) to lens and rewrite the data of CH30 so as to set in back light correction mode. 4) Rewrite the data of CH1A so that carrier amplitude of gray scale 9th gradation becomes 250 ± 30 mVp-p. 5) Rewrite the data of CH30 so as to return to standard mode and check that color of gray scale 11th gradation is light on the monitor.   0.2 Vp-p/div Before adjustment ➡ 0.2 Vp-p/div After adjustment
16. Auto White Offset Adjustment ● Terminal EE output ● Address CH12 <u>R-Offset</u> CH13 <u>B-Offset</u> ● Meter Vectorscope ● Object Gray scale	1) Projecting gray scale in standard condition, rewrite the data of white balance mode (CH11) into 1E to set in auto white balance mode. 2) Rewrite the data of CH12 and CH13 so that the brightness point of vectorscope comes to the center.   EE output Incomplete adjustment. EE output Optimum adjustment

Item	Adjusting method
17. Auto White Gain Adjustment - Terminal EE output - Address CH14 <u>R-Gray</u> CH15 <u>B-Gain</u> - Meter Vectorscope - Object Gray scale	1) Rewrite the data of white balance mode (CH11) into D8 to set white balance in outdoor mode. 2) Attach color temperature conversion filter (LB165) to lens. 3) Rewrite the data of CH14 and CH15 so that the brightness point of vectorscope comes to the center. 4) After adjustment is completed, rewrite the data of white balance mode (CH11) into 1E to set in auto white mode.  EE output Incomplete adjustment  EE output Optimum adjustment
18. Hall Offset Adjustment - Terminal MG (P702) ③ (Iris position) - Address CH0C <u>Hall Offset</u> - Meter Digital voltmeter - Object Gray scale	1) Projecting gray scale in standard condition, rewrite the data of CH0C to adjust to the point where voltage of iris position (pin ③ of MG (P702) connector) is switched from Low to High.
19. Focus Voltage Adjustment - Terminal TP901 TP902 - Place R971 <u>Focus voltage</u> - Meter Oscilloscope	1) Adjust R971 so that peak voltage at both ends of TP901 to TP902 becomes $4.0 \pm 0.2V$ when focus motor is rotating.  1 V/div 10 msec/div

Item	Adjusting method
20. Back Focus Adjustment - Distance of object 200 ± 1 cm - Illumination Iris open (both TELE and WIDE) - Object Siemens Star NOTE: As dislocation of back focus adjustment directly affects zoom switching and auto focus, take great care in making adjustment.	1) Make focus manual and set zoom switching in 8 times mode. 2) Adjust the center of siemens star to the center of monitor and loosen one master lens fixing screw. 3) Make zoom lever at TELE side. Turn focus ring to obtain the best point of lens focus. 4) Make zoom lever at WIDE side. Fitting tracking adjusting jig or minus driver (with fine tip) to the adjusting groove of master chassis, move lens back and forth to obtain the best point of lens focus. 5) Repeat steps 3) and 4). Back focus adjustment is completed when lens focus after adjustment of step 4) and lens focus with zoom lever at TELE side (do not turn focus ring at this time) are both at the best point. 6) After adjustment is completed, tighten one master lens fixing screw. Tightening torque $800 \text{ g}\cdot\text{cm} \pm 100 \text{ g}\cdot\text{cm}$ NOTE: Set zoom switching in 12 times mode and check if lens focus is at the best point.



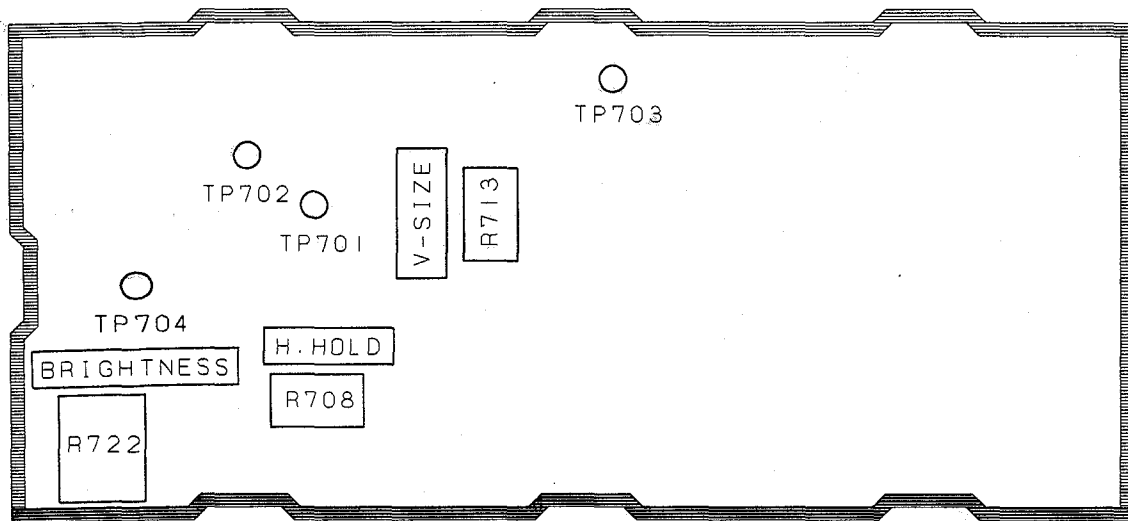
5. Adjustment of the Black-and-White Viewfinder

1. Measuring instruments and tools

- Digital voltmeter
- Input video signal (monoscope pattern signal)
Recorded tape can be used instead.
- AV input cable (unnecessary when the recorded tape is used)
- Hot melting tool
- AC adapter
- Video Movie

Location of Test Points and Controls

● Viewfinder Circuit



2. Adjustment procedure

1) Vertical free-run frequency adjustment

Measuring point : TP704
 Adjusting point : R708 (H-HOLD)
 Input signal : Monoscope pattern signal (1.0 Vp-p)
 Instrument : Digital voltmeter
 Adjust R708 (H-HOLD) so that the DC voltage at TP704 should be $2.5 \pm 0.05V$.

2) Focus adjustment

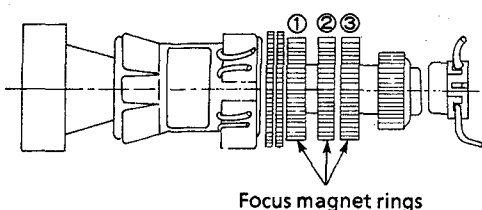
Measuring point : Viewfinder screen
 Adjusting point : Focus magnet rings (1), (2) and (3) at viewfinder CRT
 Input signal : Monoscope pattern signal (1.0 Vp-p)
 Instrument : None

Feed the monoscope pattern signal and turn, the focus magnet rings (1), (2) and (3) until more than 290 horizontal resolution lines of the monoscope pattern can be confirmed on the viewfinder screen.

Note: Be careful to keep any magnet and metallic objects away from the viewfinder.

3) Vertical size adjustment

Measuring point : Viewfinder screen
 Adjusting point : R713 (V-SIZE)
 Input signal : Monoscope pattern signal
 Instrument : None
 Adjust R713 (V-SIZE) so that the monoscope pattern's circle should be perfect on the CRT screen.



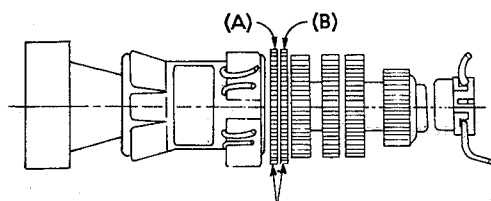
4) Centering adjustment

Measuring point : Viewfinder screen
 Adjusting point : Centering magnet rings
 (A) and (B) at viewfinder
 CRT

Input signal : Monoscope pattern
 signal

Instrument : None

Feed the monoscope pattern signal and turn the centering magnet rings (A) and (B), as shown below, until monoscope pattern should come centered on the CRT screen.



Centering magnet rings

Note: Be careful to keep any magnet and metallic objects away from the viewfinder.

Now make sure that there is no broken characters and other troubles. Using the hot melting tool, fix the centering magnet rings (A) and (B) as well as the focus magnet rings (1), (2) and (3).

5) Brightness adjustment

Measuring point : Viewfinder screen

Adjusting point : R722 (BRIGHT)

Input signal : Monoscope pattern
 signal

Find a point where the 1st black tone and the 2nd black tone of the monoscope pattern signal can be identified.

Adjust R722 (BRIGHT) to fix the brightness a little brighter than the above point.

ADJUSTMENT OF VCR

• Instruments

- Color monitor TV
- DC regulated power supply
- VTVM

- Oscilloscope
- Audio generator (CR Oscillator)

- Color bar generator
- Alignment tape

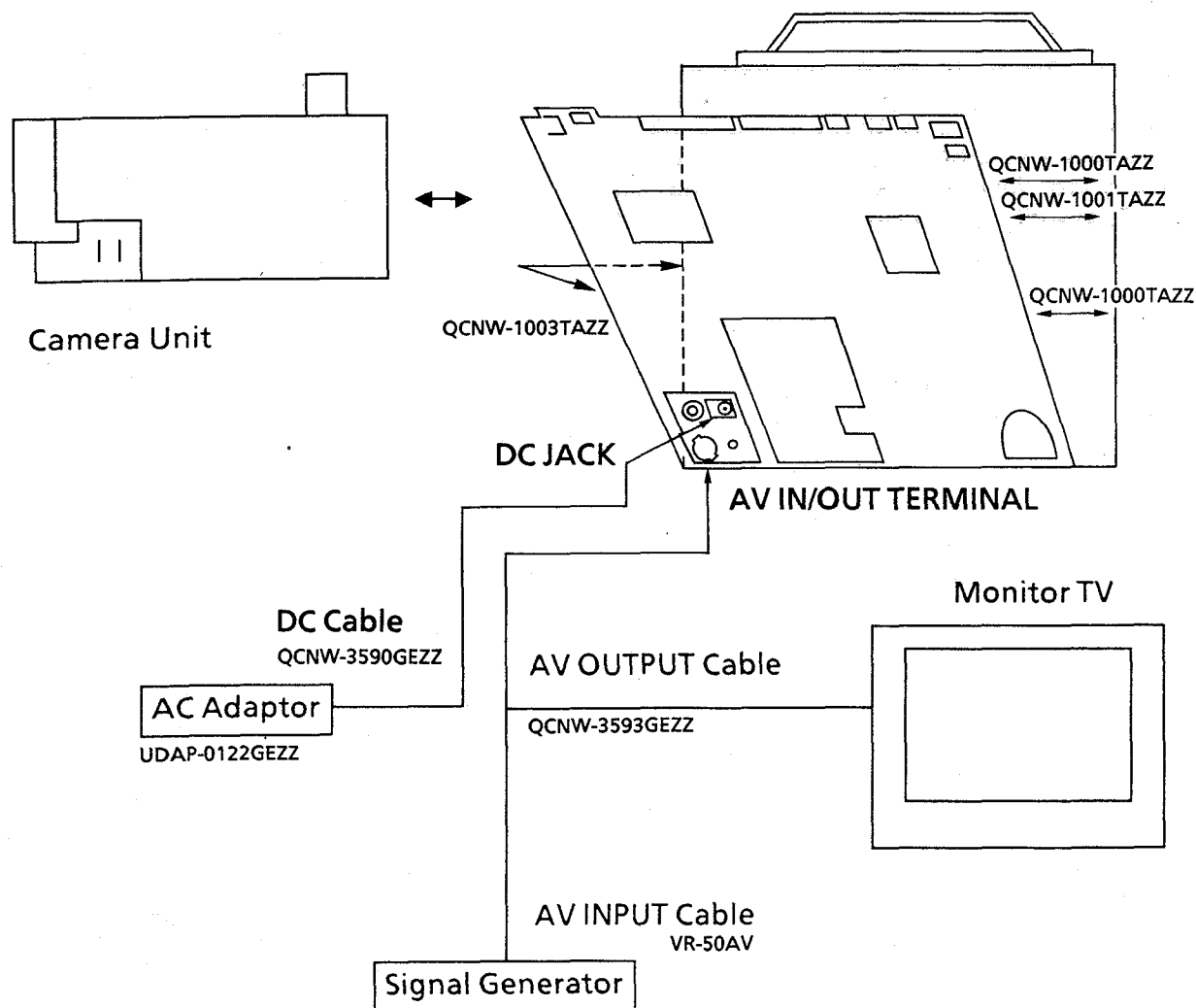
- Frequency counter
- Recording video tape (VHS)

Prior to the adjustment :

Most of the electrical adjustments are required after mechanical parts (video head included) have been replaced. Check that all the mechanical functions are normal before attempting adjustment of the electrical circuits.

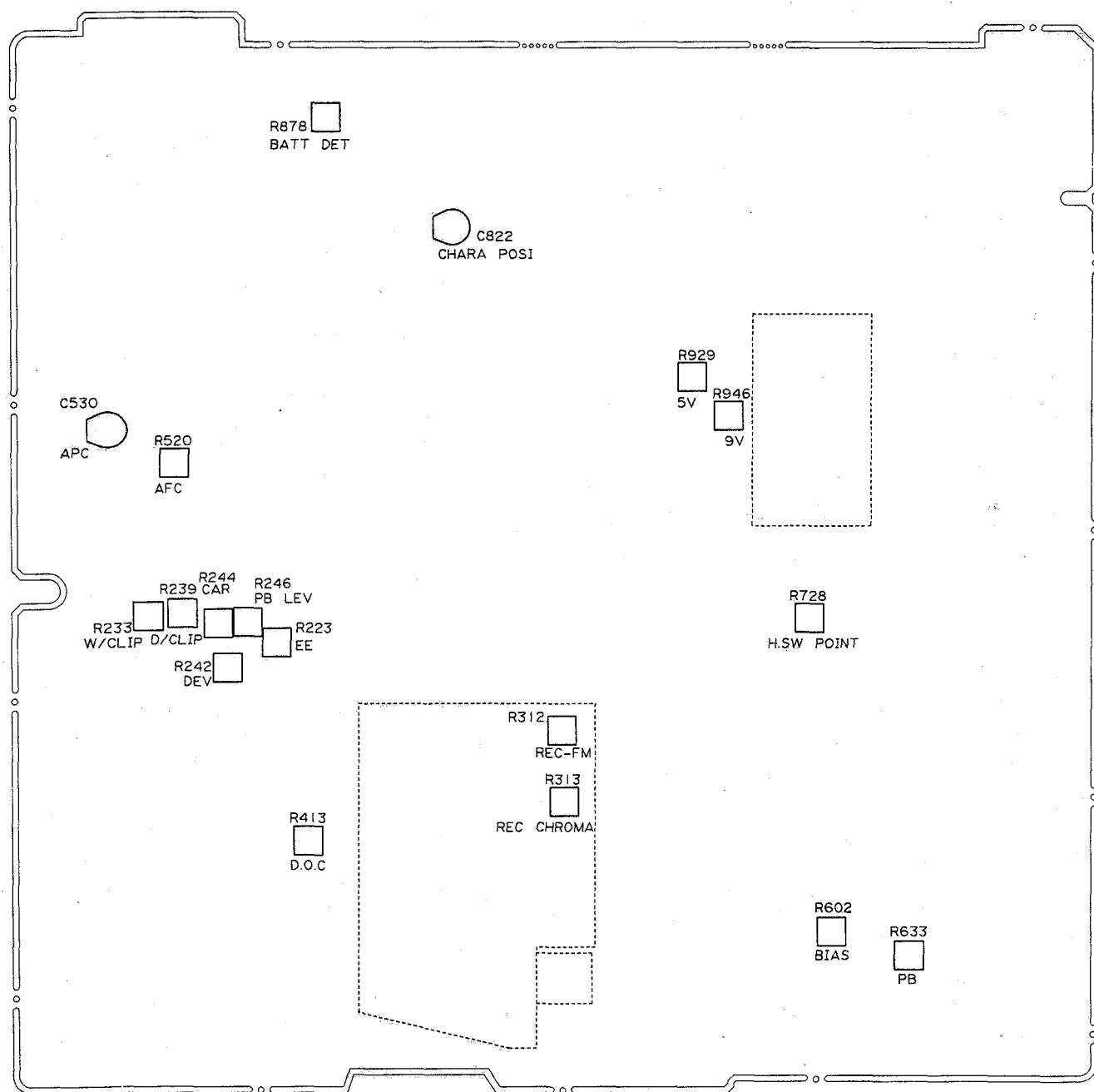
Electrical adjustments require proper troubleshooting. After repair or parts replacement the following alignments may be required.

Basic Connection FOR VCR Adjustment



Location of Test Points and Controls

• VCR Main Circuit



● POWER CIRCUIT

Preparations

Mode	: Stop
Input signal	: None
Test signal (audio/video)	: Camera signal
Specification	: $13.0 \pm 0.2V$
Instrument	: VTVM

1. Plug the AC adapter in the unit and turn on the power.
2. Make sure the input voltage is as specified.
3. Make pins ① and ② of the connector AS (P18) at the test point short-circuited and set the unit to the camera mode.
4. Set the full auto lock switch.

+ 5.1V adjustment

Mode	: Stop
Test point	: TP901, TP903 (GND)
Adjustment point	: R929
Specification	: $5.1 \pm 0.05 V$
Instrument	: VTVM

1. Connect the VTVM to TP901 and TP903 (GND).
2. Adjust R929 so that the voltage level of TP901 becomes $5.1 \pm 0.05V$.

+ 9V adjustment

Mode	: Stop
Test point	: TP902, TP903 (GND)
Adjustment point	: R946
Specification	: $9.0 \pm 0.05 V$
Instrument	: VTVM

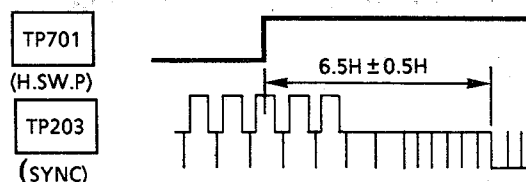
1. Connect the VTVM to TP902 and TP903 (GND).
2. Adjust R946 so that the voltage level at TP902 becomes $9 \pm 0.05V$.

● SERVO CIRCUIT

Head switching point adjustment

Mode	: PB
Input signal	: Alignment tape
Test point	: TP701 (Trigger), TP203
Adjustment point	: R728
Specification	: $6.5 \pm 0.5 H$
Instrument	: Oscilloscope

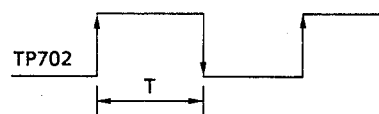
1. Trigger pulse is given at TP701.
2. Set the tracking control while pressing the tracking switch to put the unit in tracking preset condition.
3. Adjust R728 so that the trailing edge of the vertical sync signal at TP203 (video output) be $6.5 \pm 0.5H$ away from the leading edge of the head switching pulse at TP701.



Remarks on X-position

Mode	: PB
Test point	: TP702 (tracking monitor output)
Specification	: $T = 16.6 \pm 0.3 \text{ msec}$
Instrument	: Oscilloscope

1. Set to playback mode. (Use 4-head X-position adjusting tape.)
2. Perform X-position adjustment after confirming that the "H" level period at TP702 (tracking monitor output) is $T = 16.6 \pm 0.3 \text{ msec}$. (In case the "H" level period is out of this range, bring the tracking center within the specified range.)



● SYSTEM CONTROL CIRCUIT

Voltage detector adjustment

Mode	: REC (REC PAUSE)
Adjustment point	: R878
Test signal (audio/video)	: Camera signal
Specification	: P-OFF

1. Turn R878 about 45° clockwise, and turn on the power switch.
2. Set the supply voltage to $10.3 \pm 0.1V$ at the battery terminals.
3. Slowly turn R878 counterclockwise until the power is turned off.

Voltage detector check 1

Mode	: REC (REC PAUSE)
Test signal (audio/video)	: Camera signal
Specification	: E----F

Set the supply voltage to $12.3 \pm 0.1V$ at the battery terminals and make sure all the three voltage indicator bars show up.

Voltage detector check 2

Specification : P-OFF

Set the supply voltage to $10.0 \pm 0.1\text{V}$ at the battery terminals. Press the power switch and make sure no power is turned on.

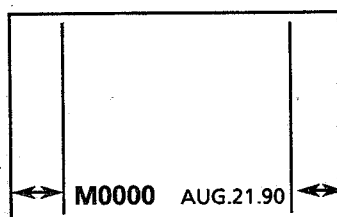
On - Screen display position adjustment

Mode : Stop (VCR mode)

Adjustment point : C822

Instrument : TV set

Note: Make sure that the length of space is identical for both left side of counter memory and right side of auto date indicator.

**• Y/C CIRCUIT****EE level adjustment**

Mode : EE

Test point : TP203, TP202 (GND), TP211 (trigger)

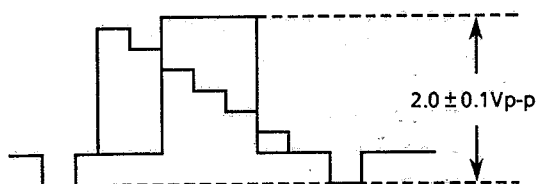
Adjustment point : R223

Test signal (audio/video) : —/Color bar

Specification : $2.0 \pm 0.1\text{Vp-p}$

Instrument : Oscilloscope

1. Connect the oscilloscope to TP203.
2. Feed the color bar input signal. Adjust R223 so that the video output level be $2.0 \pm 0.1\text{Vp-p}$.

**Playback Y level adjustment**

Mode : PB

Input signal : Alignment tape (staircase wave)

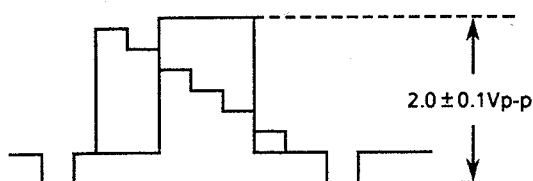
Test point : TP203, TP202 (GND), TP211 (trigger)

Adjustment point : R246

Specification : $2.0 \pm 0.1\text{Vp-p}$

Instrument : Oscilloscope

1. Connect the oscilloscope to TP203.
2. Play back the recorded color bar tape.
3. Adjust R246 so that the video output level be $2.0 \pm 0.1\text{Vp-p}$.

**DOC level adjustment**

Mode : PB

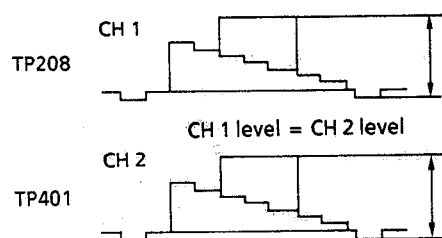
Input signal : Alignment tape

Test point : TP401, TP208, TP211 (trigger)

Adjustment point : R413

Specification : CH-2 level = CH-1 level

Instrument : Oscilloscope



1. Connect the oscilloscope to TP208, TP401.
2. Play back the self-recorded color bar tape.
3. Adjust R413 to have the same level at TP208 and TP401.

FM carrier adjustment

Mode : EE

Test point : TP207

Adjustment point : R244

Test signal (audio/video) : —/No signal

Specification : $3.45\text{MHz} \pm 50\text{kHz}$

Instrument : Frequency counter

Note: Make this adjustment only when IC203 has been replaced or when the carrier deviation is apparently out of specification.

1. Keep the video input terminal open.
2. Connect the frequency counter to TP207.
3. Adjust R244 so that the frequency counter reading be $3.45\text{MHz} \pm 50\text{kHz}$.

Carrier deviation adjustment

Mode : Self-REC/PB

Input signal : Self-recorded tape

Test point : TP203, TP211 (trigger)

Adjustment point : R242

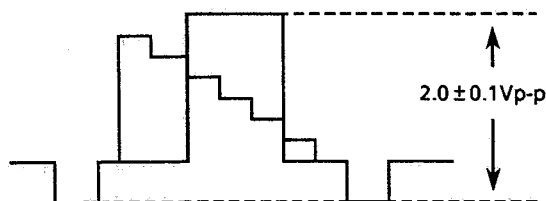
Test signal (audio/video) : —/Color bar

Specification : $2.0 \pm 0.1\text{Vp-p}$

Instrument : Oscilloscope

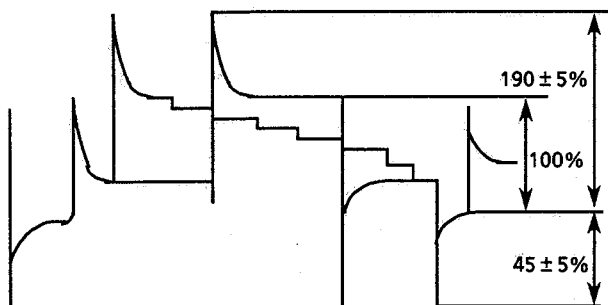
Note: Make this adjustment only when IC203 has been replaced or when the carrier deviation is apparently out of specification.

1. First make sure the EE level and playback-Y level are as specified.
2. Feed the color bar input signal to make self-recording and playback.
3. Observe the playback video signal level at TP203. If the level is below 2.0Vp-p , turn R242 clockwise. If it is above 2.0Vp-p , turn R242 counterclockwise. Make self-recording again.
4. Repeat the above step 3 until the playback video signal level comes within $2.0 \pm 0.1\text{Vp-p}$, as shown below.

**White/dark clip adjustment**

Mode	: EE
Test point	: TP206, TP211 (trigger)
Adjustment point	: R233 (white) R239 (dark)
Test signal (audio/video)	: —/Color bar
Specification	: White = $190 \pm 5\%$ Dark = $45 \pm 5\%$
Instrument	: Oscilloscope

1. Connect the oscilloscope to TP206.
2. Feed the color bar input signal.
3. Adjust R233 to obtain the white portion of $190 \pm 5\%$ and R239 for the dark portion of $45 \pm 5\%$ in the sync tip.

**Automatic phase control adjustment**

Mode	: PB
Input signal	: Recorded tape
Test point	: TP501
Adjustment point	: C530 (trimmer)
Specification	: 3579545 ± 15 Hz
Instrument	: Frequency counter

1. Connect the frequency counter to TP501.
2. Play back the recorded tape.
3. Adjust C530 so that the frequency counter reading be 3579545 ± 15 Hz.

40fH AFC free-run frequency adjustment

Mode	: EE
Test point	: TP502
Adjustment point	: R520
Specification	: 629 ± 5 kHz
Instrument	: Frequency counter

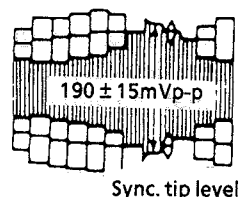
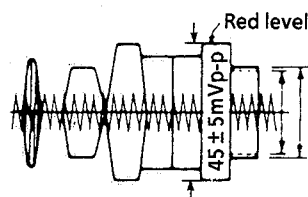
Note: If a tape is in, bring up the cassette housing controller.

1. Connect the frequency counter to TP502.
2. Make test point 5 short-circuited. (Ground the V-EE, PS-OFF and 358-MHz points.)
3. Adjust R520 to make the frequency 629 ± 5 kHz.

Recording current adjustment

Mode	: REC
Input signal	: Self-recorded tape
Test point	: TP301, TP302 (GND), TP211 (trigger)
Adjustment point	: R313(C), R312(Y)
Test signal (audio/video)	: —/Color bar
Specification	: C = 45 ± 5 mVp-p (red portion) Y = 190 ± 15 mVp-p (sync tip portion)
Instrument	: Oscilloscope

1. Connect the oscilloscope's GND to TP302 and its SIG to TP301.
Attention: Keep the probe's GND for external trigger TP211 in contact.
2. Feed the color bar input signal. Bring in the record mode.
3. Turn R312 to minimum to reduce the Y FM signal as far as possible.
4. Adjust R313 so that the red portion of the chroma signal be 45 ± 5 mVp-p.
5. Adjust R312 so that the FM level of the sync tip portion be 190 ± 15 mVp-p.



● AUDIO CIRCUIT

EE level check

Mode	: REC (AV input)
Test point	: Audio output
Test signal (audio/video)	: 1kHz - 8 dBs (308mVrms)/ Color bar
Specification	: - 8dBs $\pm$ 3dB (308mVrms)
Instrument	: VTVM

Feed the input of 1KHz, - 8dBs (308mVrms) to the audio input terminal. Hook up the VTVM to the audio output terminal and make sure the output level is - 8dBs (308 mVrms) $\pm$ 3dB.

Playback level adjustment

Mode	: PB
Input signal	: Alignment tape
Test point	: Audio output
Adjustment point	: R633
Specification	: - 8dBs $\pm$ 1dB (308mVrms)
Instrument	: VTVM

1. Connect the VTVM to the audio output terminal.
2. Play back the alignment tape.
3. Adjust R633 so that the output level be - 8 dBs (308 mVrms).

AE erase voltage oscillation frequency check

Mode	: REC
Input signal	: Self-recorded tape
Test point	: TP601, TP602 (GND)
Specification	: Above 10Vp-p 70 $\pm$ 5 kHz
Instrument	: Oscilloscope

1. Connect the oscilloscope to TP601 and TP602 (GND).
2. Bring in the record mode. Make sure the oscillation voltage is above 10Vp-p and the oscillation frequency is 70 $\pm$ 5kHz.

Bias current adjustment

Mode	: REC
Input signal	: Self-recorded tape
Test point	: TP603, TP604
Adjustment point	: R602
Test signal (audio/video)	: No signal/Color bar
Specification	: 2.9 $\pm$ 0.1 mVrms
Instrument	: VTVM

1. Connect the VTVM to TP603 (hot) and TP604 (cold).
2. Bring in the record mode. Adjust R602 to obtain the output level of 2.9 mVrms.

Recording/playback level check

Mode	: REC/PB
Input signal	: Self-recorded tape
Test point	: Audio output
Test signal (audio/video)	: 1kHz - 8 dBs (308mVrms)/Color bar
Specification	: PB level = - 8dBs $\pm$ 3dB (308mVrms)
Instrument	: VTVM

1. Feed the input of 1KHz, - 8dBs (308mVrms) to the audio input terminal. Make recording space of this signal.
2. Hook up the VTVM to the audio output terminal. Play back the above recorded portion to make sure the output level is - 8dBs (308mVrms) $\pm$ 3dB.

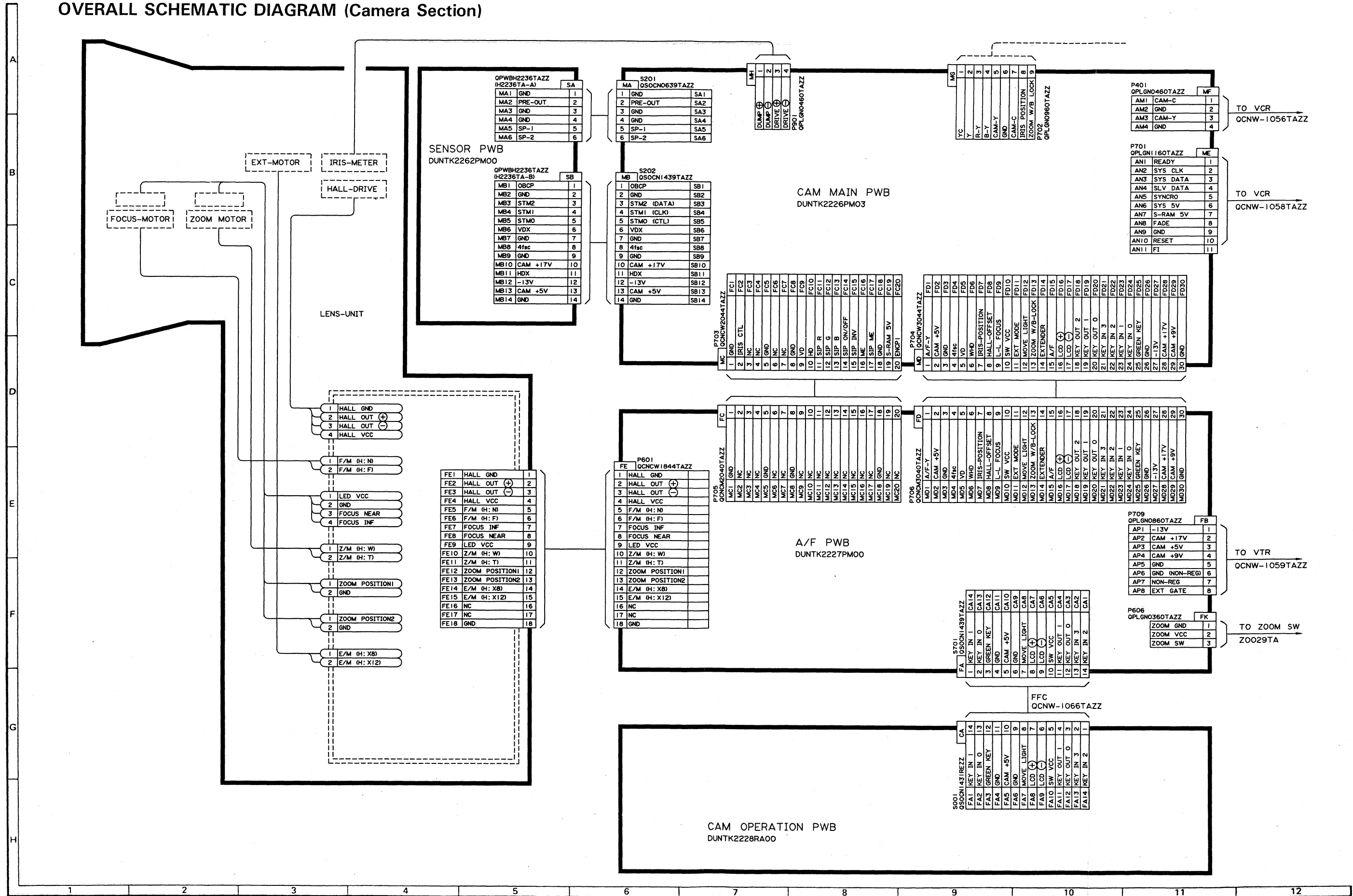
Dubbing - in/playback level check

Mode	: A-DUB/PB
Input signal	: Dubbing/Playback tape
Test point	: Audio output
Test signal (audio)	: 1kHz - 8 dBs (308mVrms)
Specification	: PB level = - 8dBs $\pm$ 3dB (308mVrms)
Instrument	: VTVM

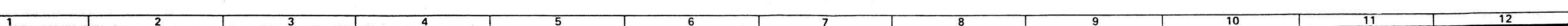
Make recording in the dubbing mode. All the others are the same as in the preceding item.

VL-L330U

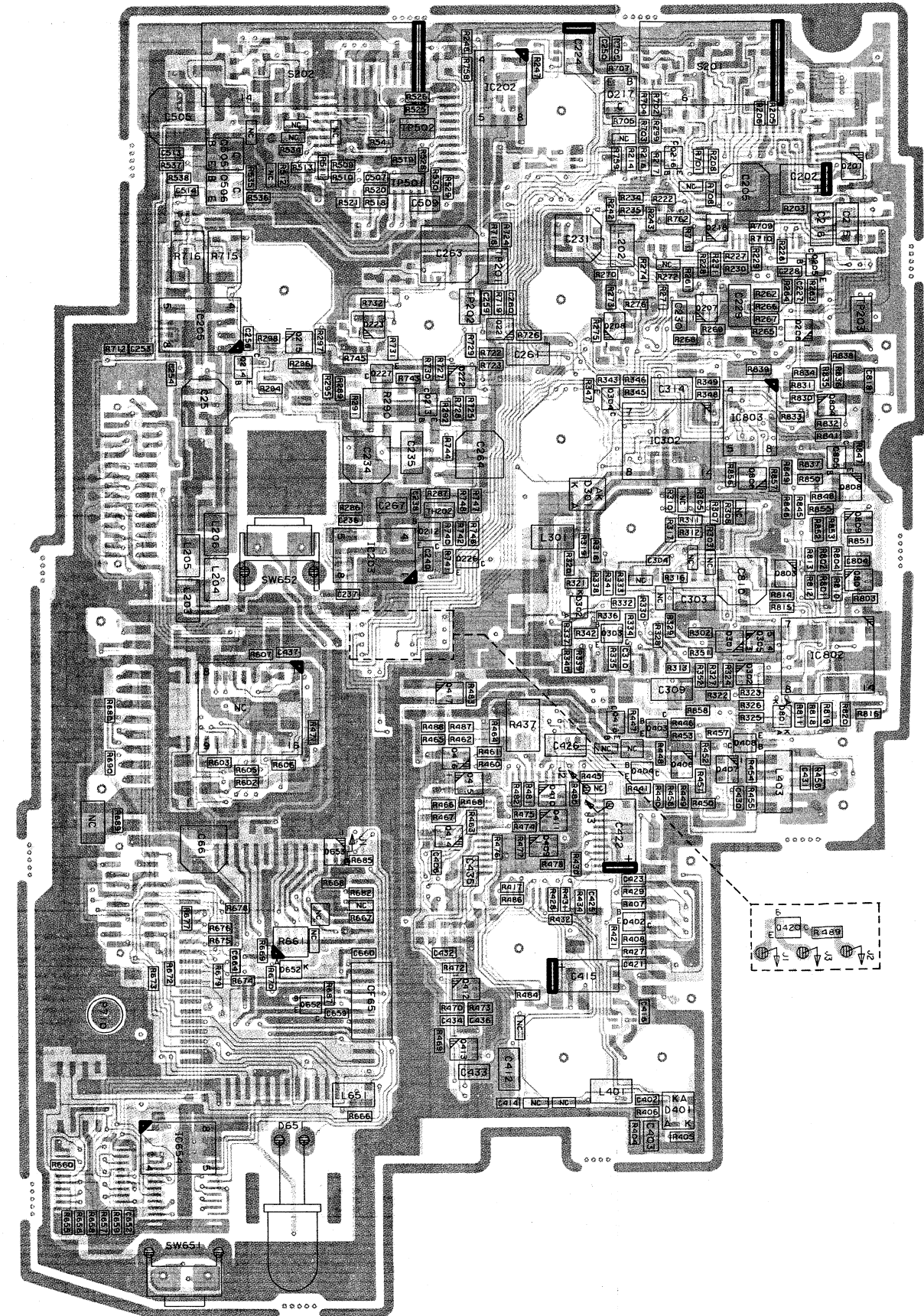
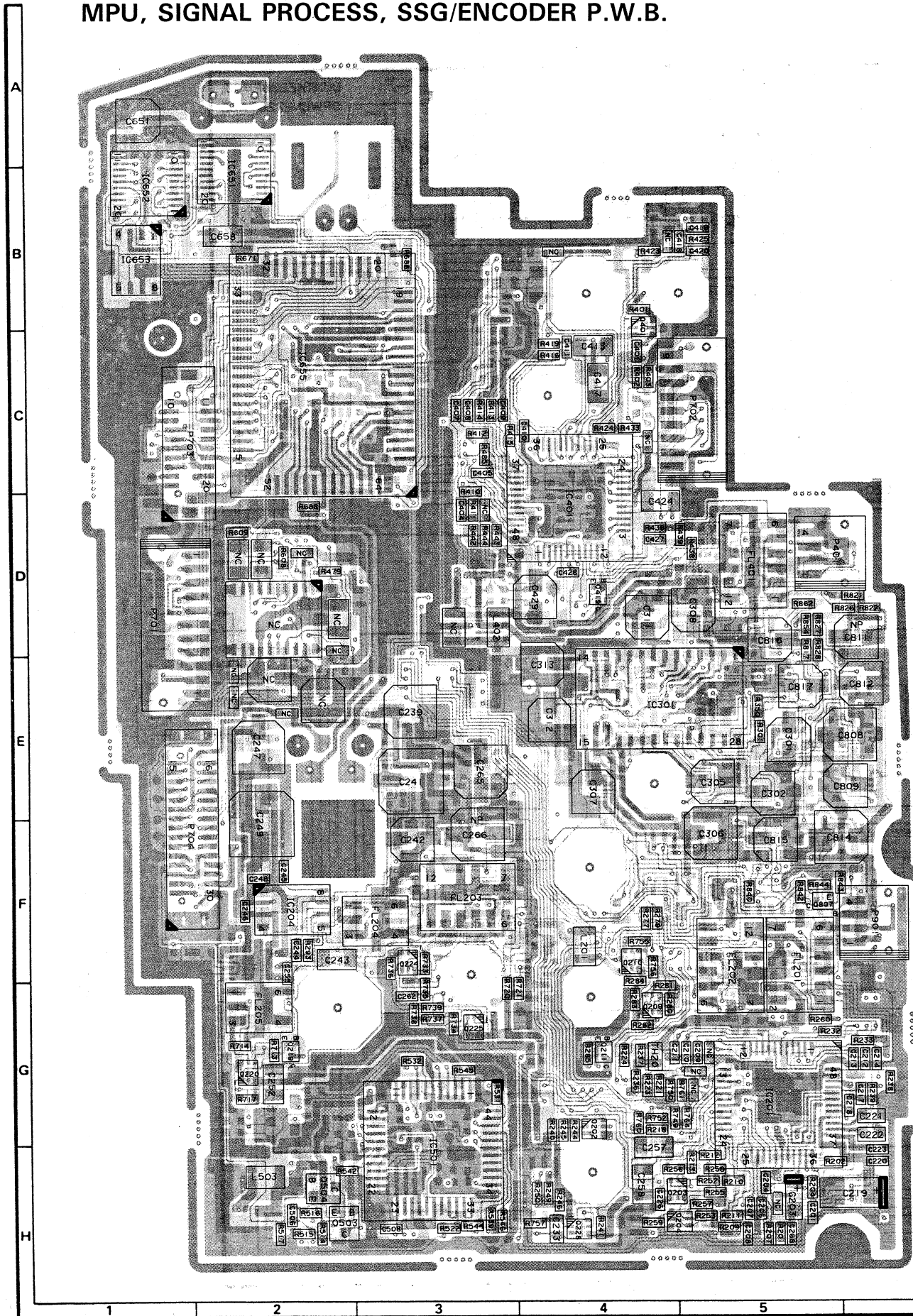
OVERALL SCHEMATIC DIAGRAM (Camera Section)



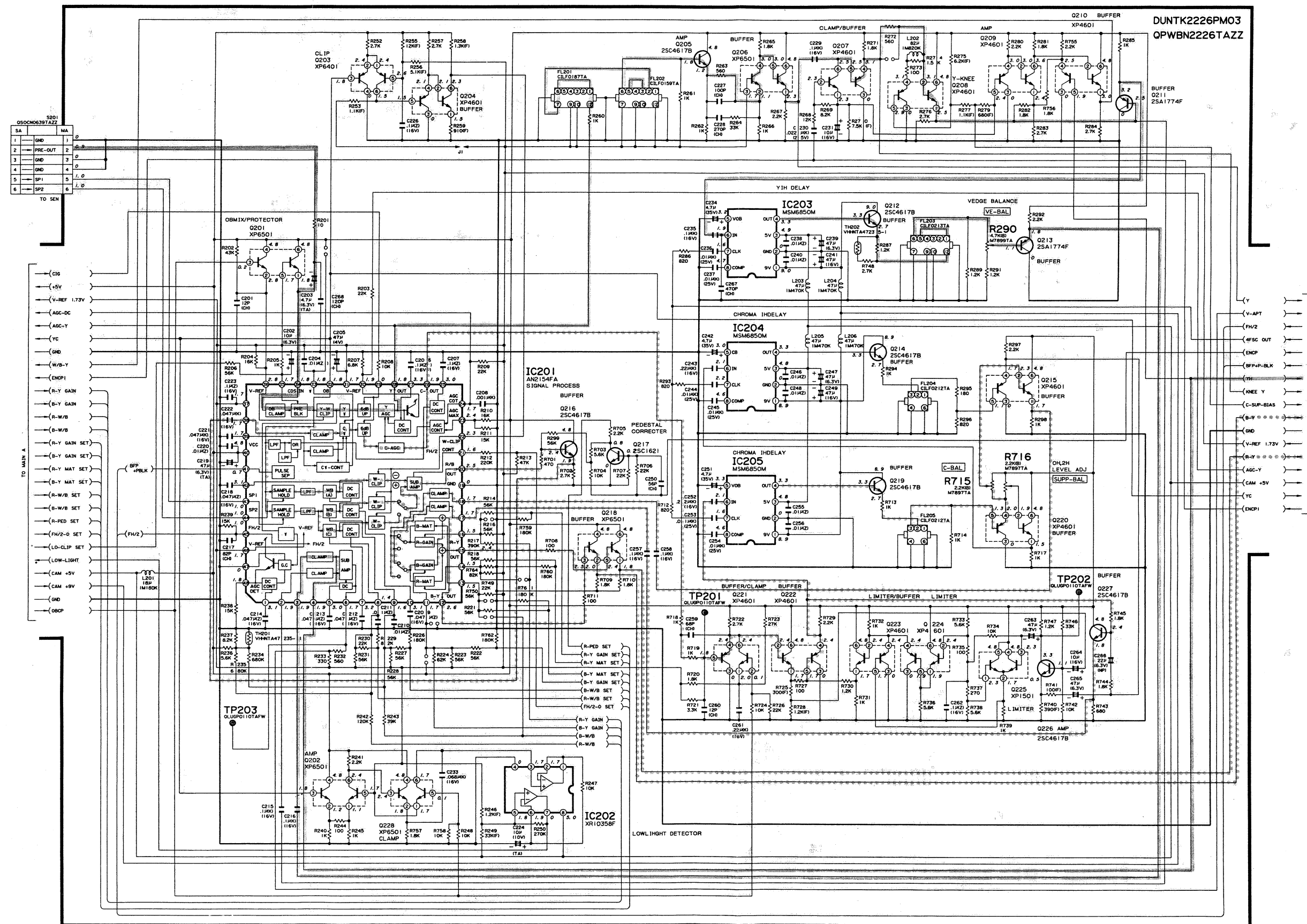
A
B
C
D
E
F
G
H



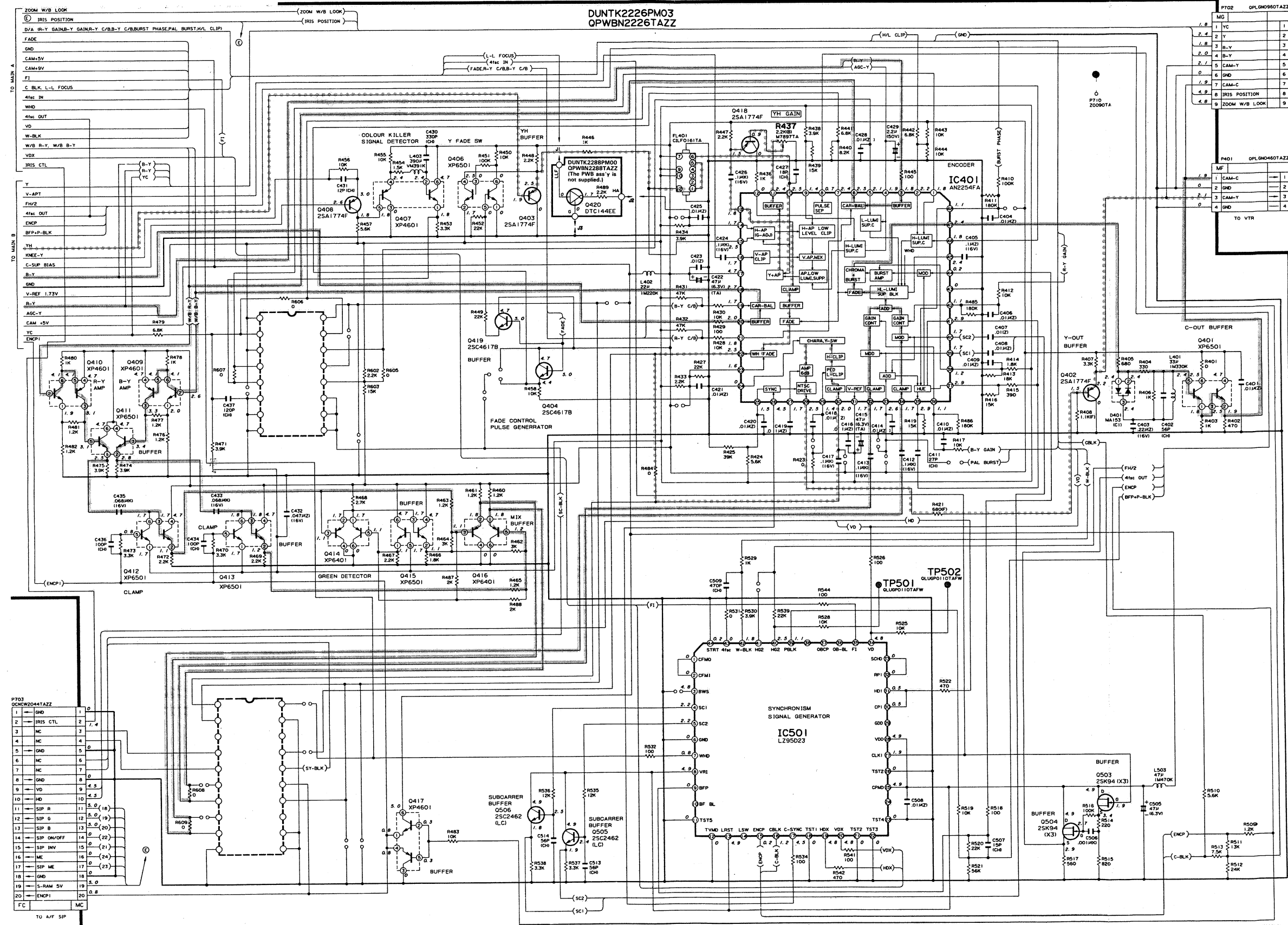
MPU, SIGNAL PROCESS, SSG/ENCODER P.W.B.



- **Color Signal**

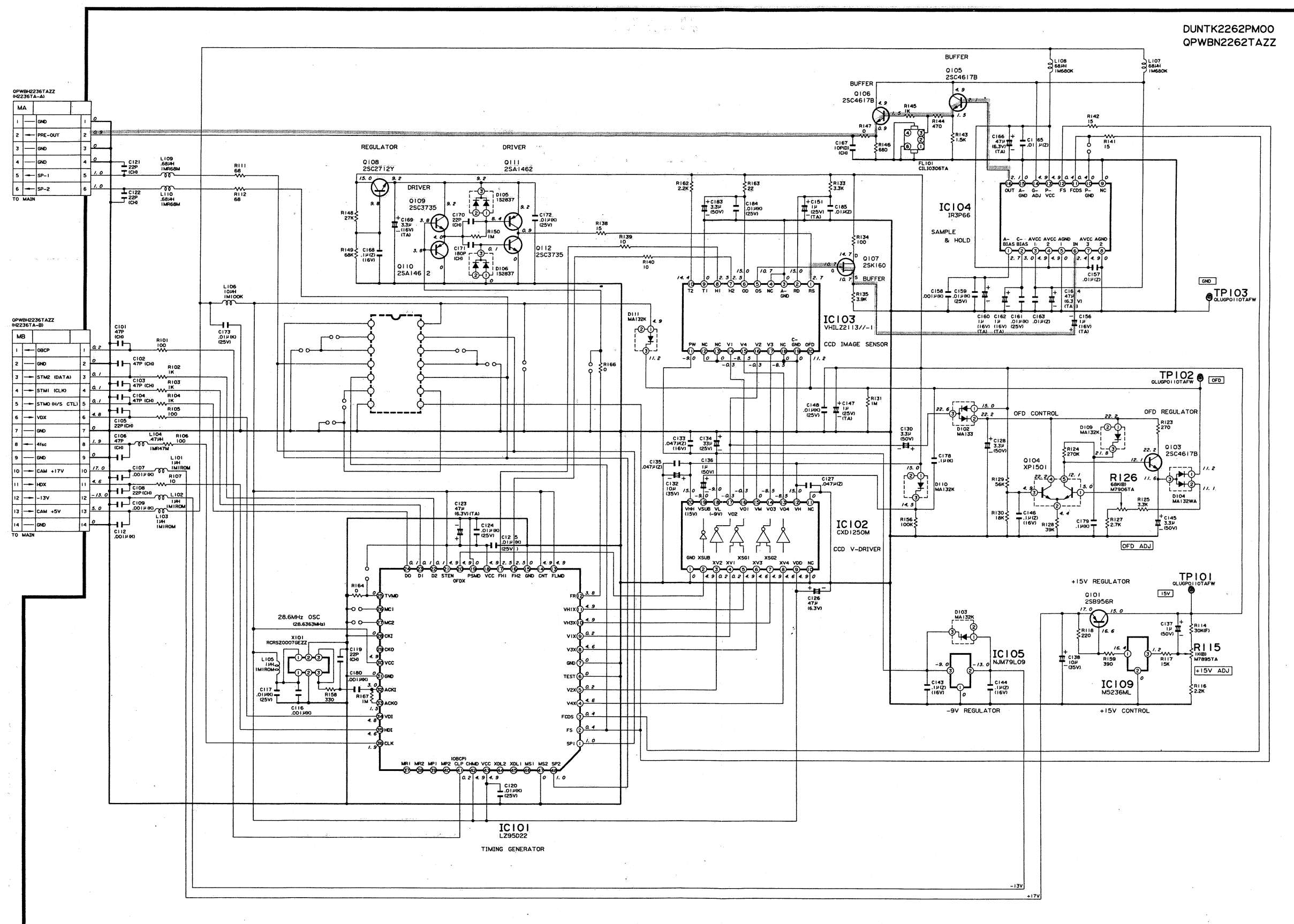


◆◆◆◆◆◆◆◆◆◆ **Luminance Signal** ◆◆◆◆◆◆◆◆◆◆ **Color Signal**

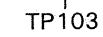


SENSOR CIRCUIT SCHEMATIC DIAGRAM

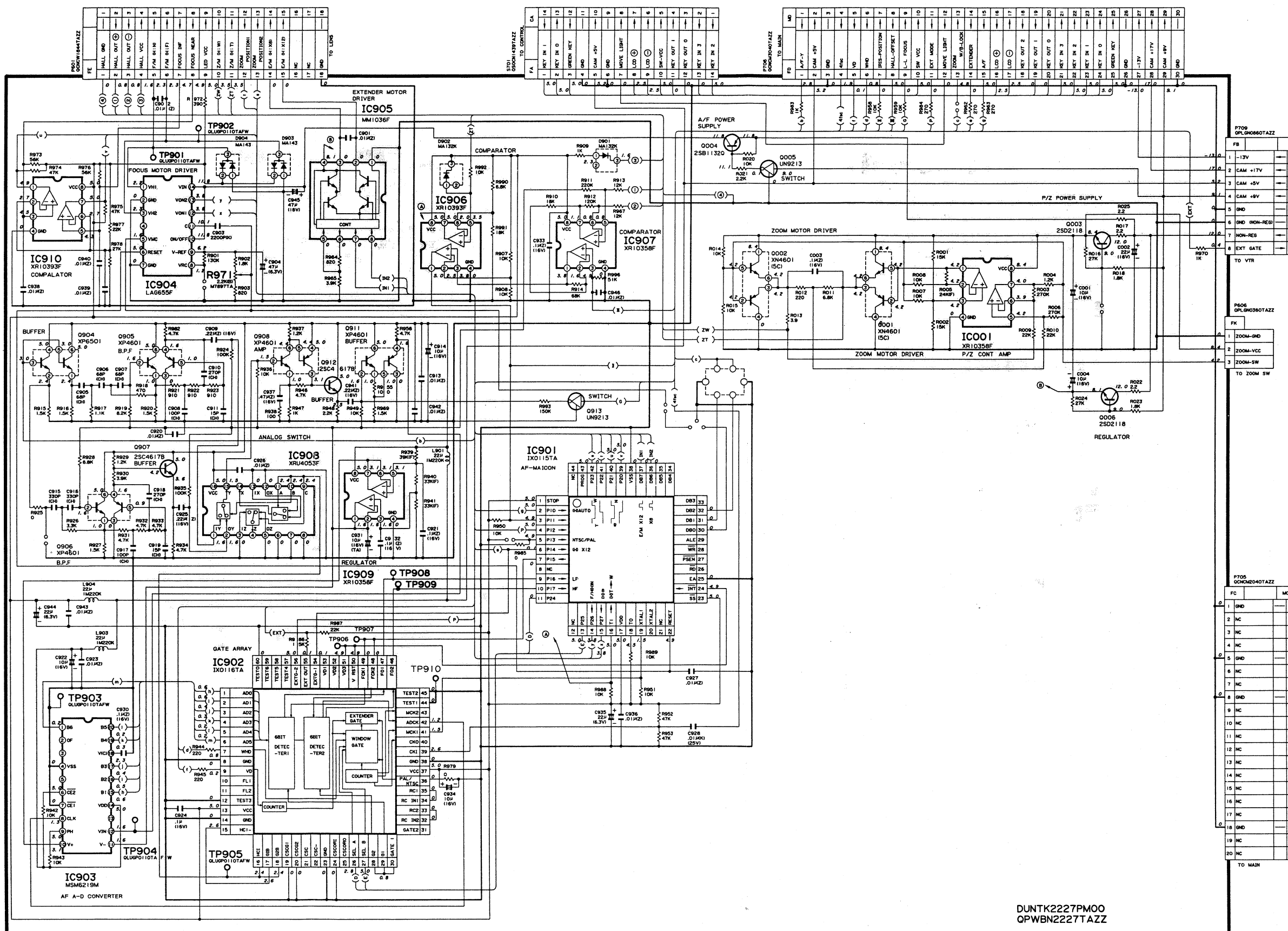
Luminance/Color Signal



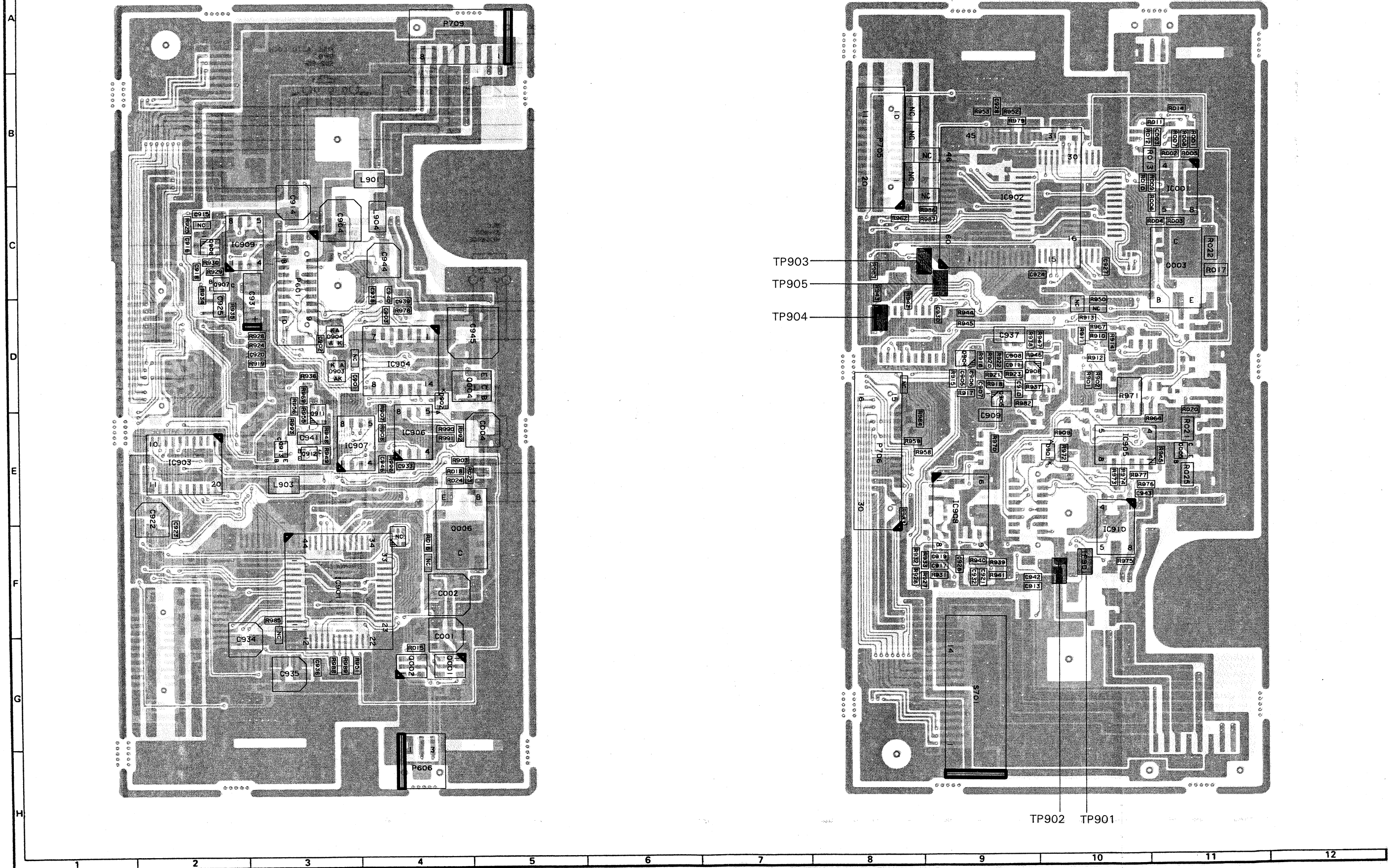
A
B
C
D
E
F
G
H



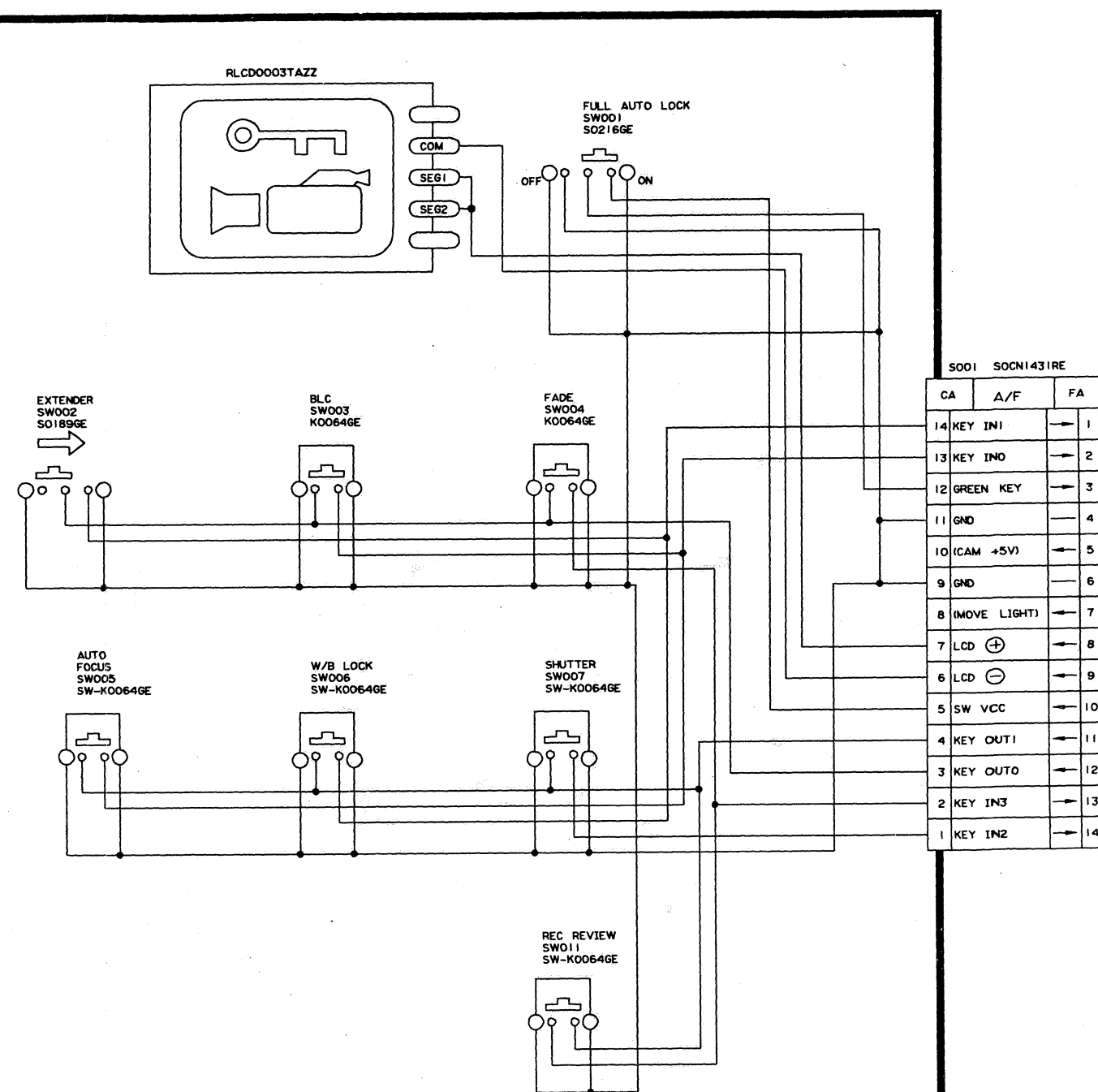
AUTO FOCUS CIRCUIT SCHEMATIC DIAGRAM



AUTO FOCUS P.W.B.

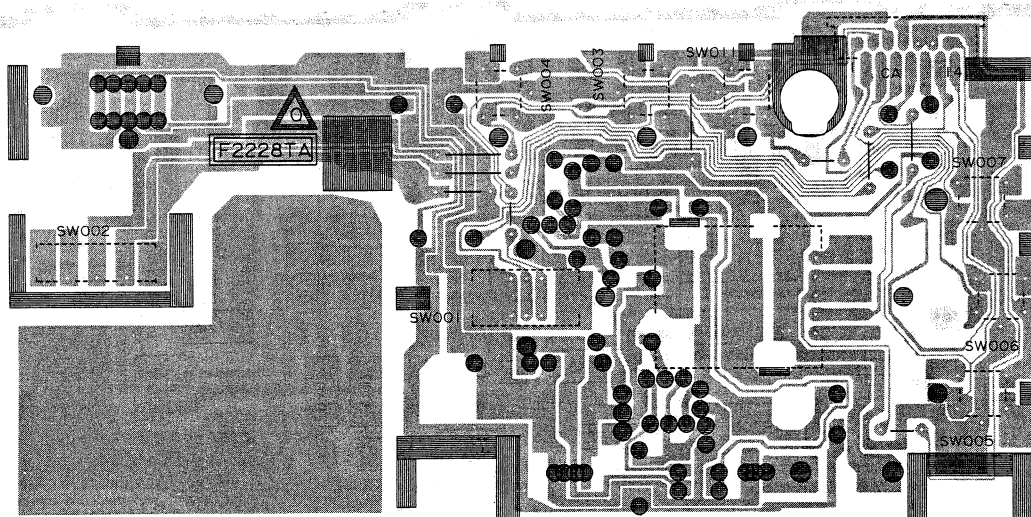
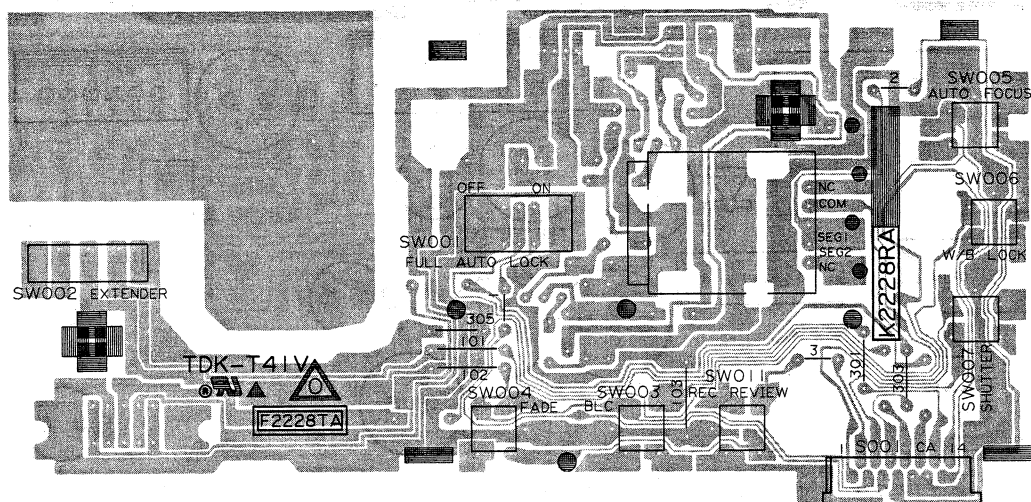


OPERATION CIRCUIT SCHEMATIC DIAGRAM



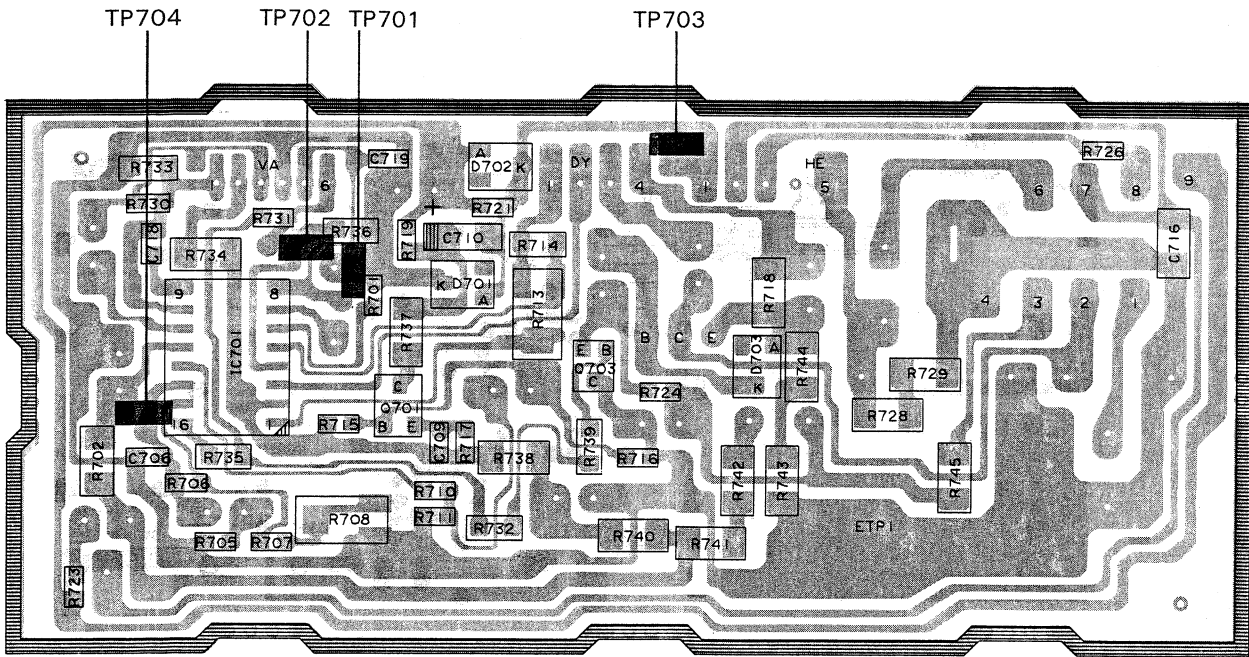
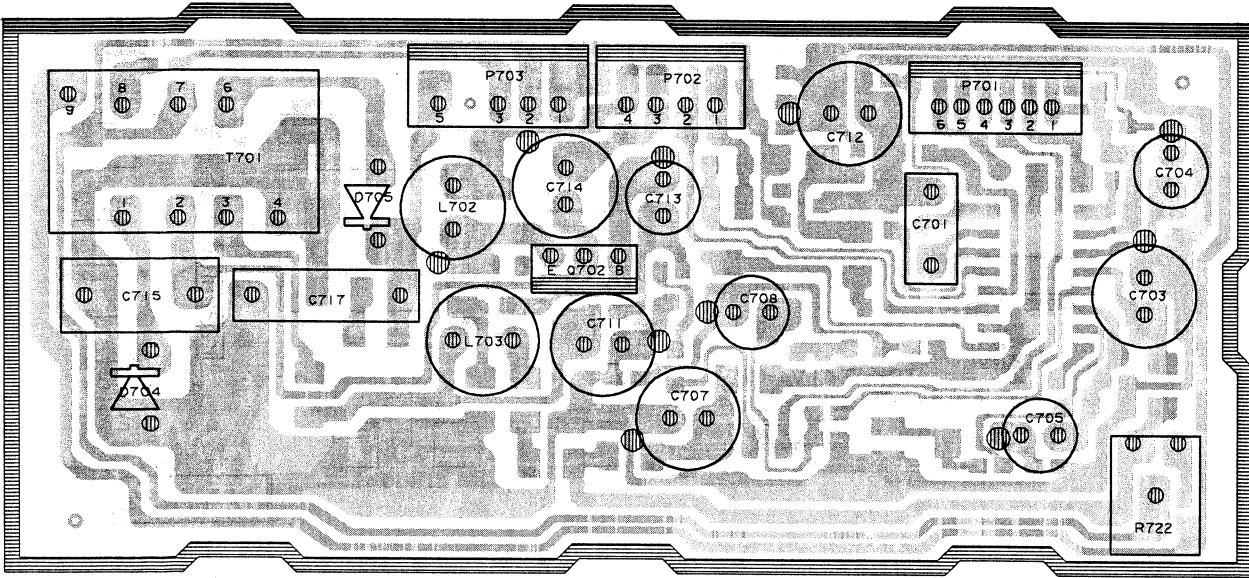
QPWBF2228TAZZ
DUNTK2228RA00

OPERATION P.W.B.



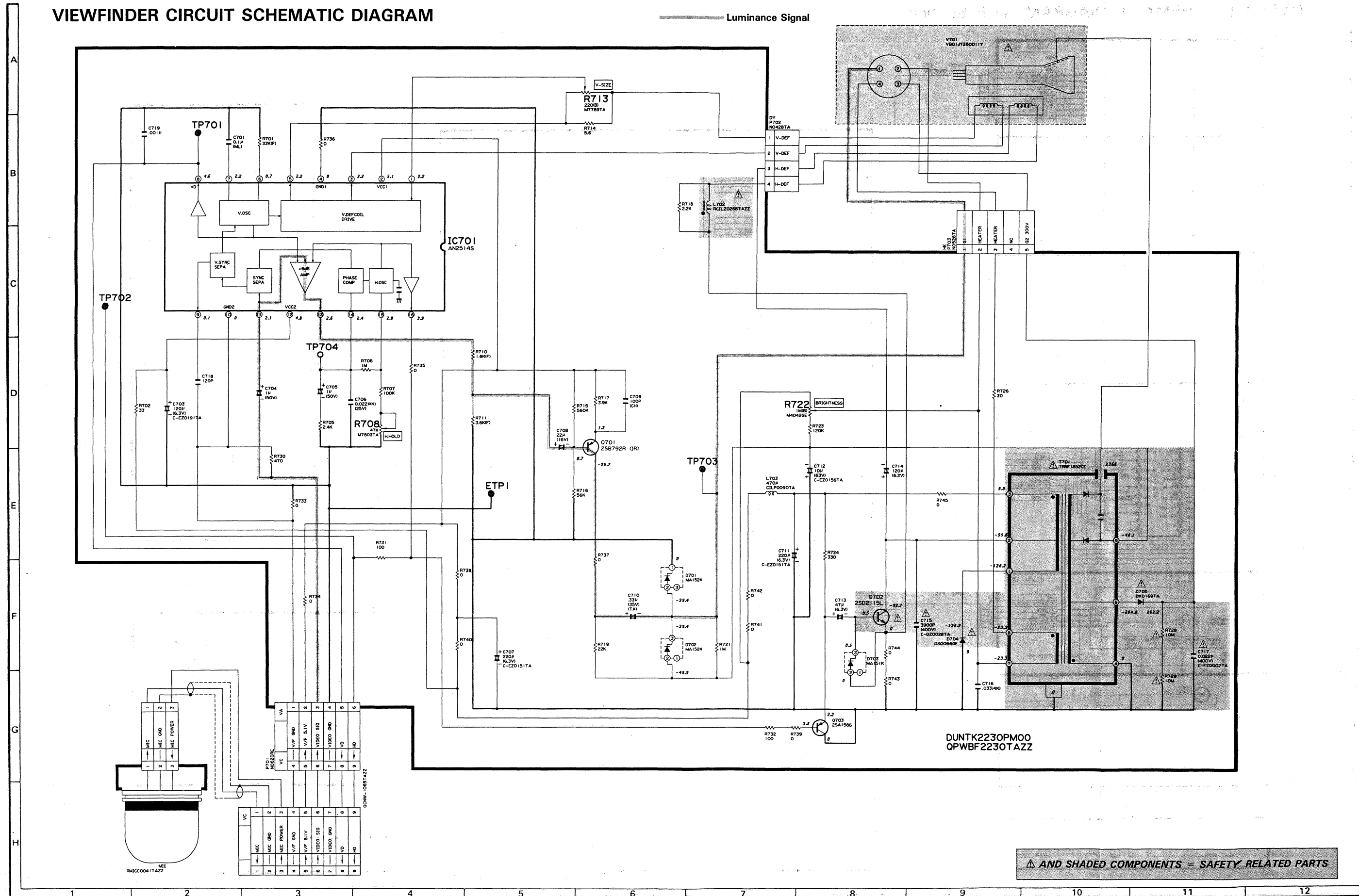
VIEWFINDER P.W.B.

BIOGRAPHICAL

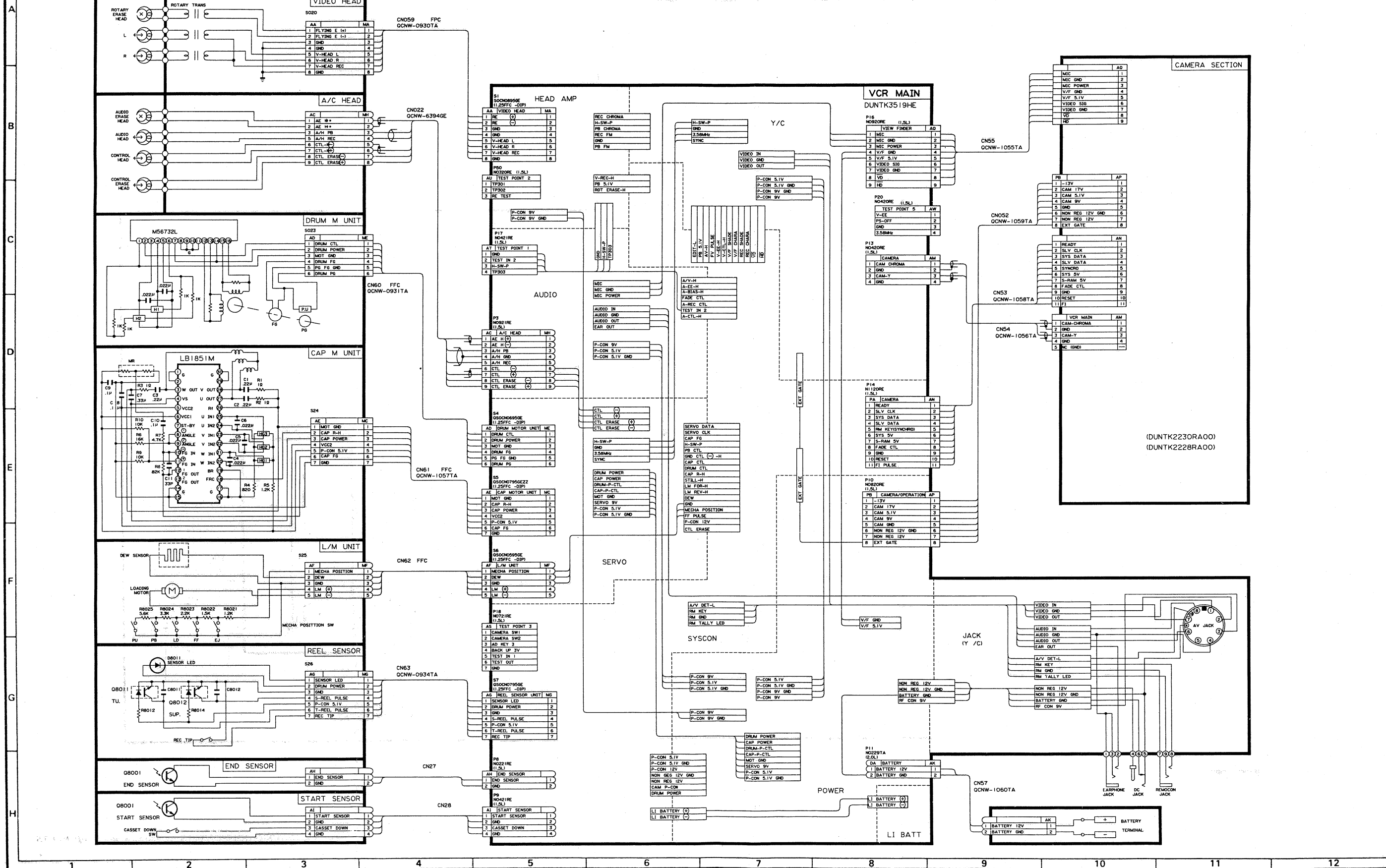


VIEWFINDER CIRCUIT SCHEMATIC DIAGRAM

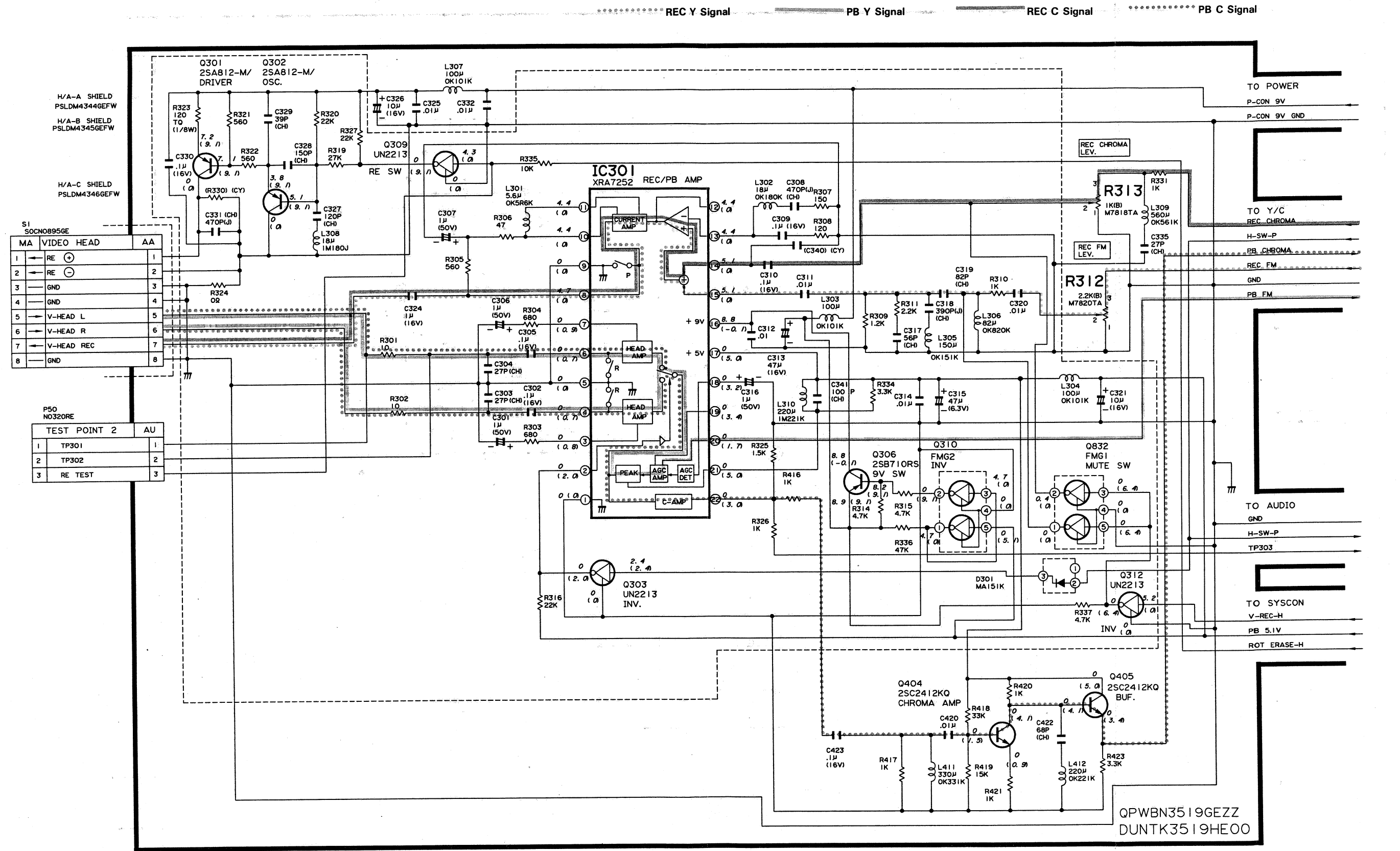
Luminance Signal



OVERALL SCHEMATIC DIAGRAM (VCR Section)



HEAD AMP. CIRCUIT SCHEMATIC DIAGRAM



Y/C CIRCUIT SCHEMATIC DIAGRAM

AV EE Signal

CAM Y EE Signal

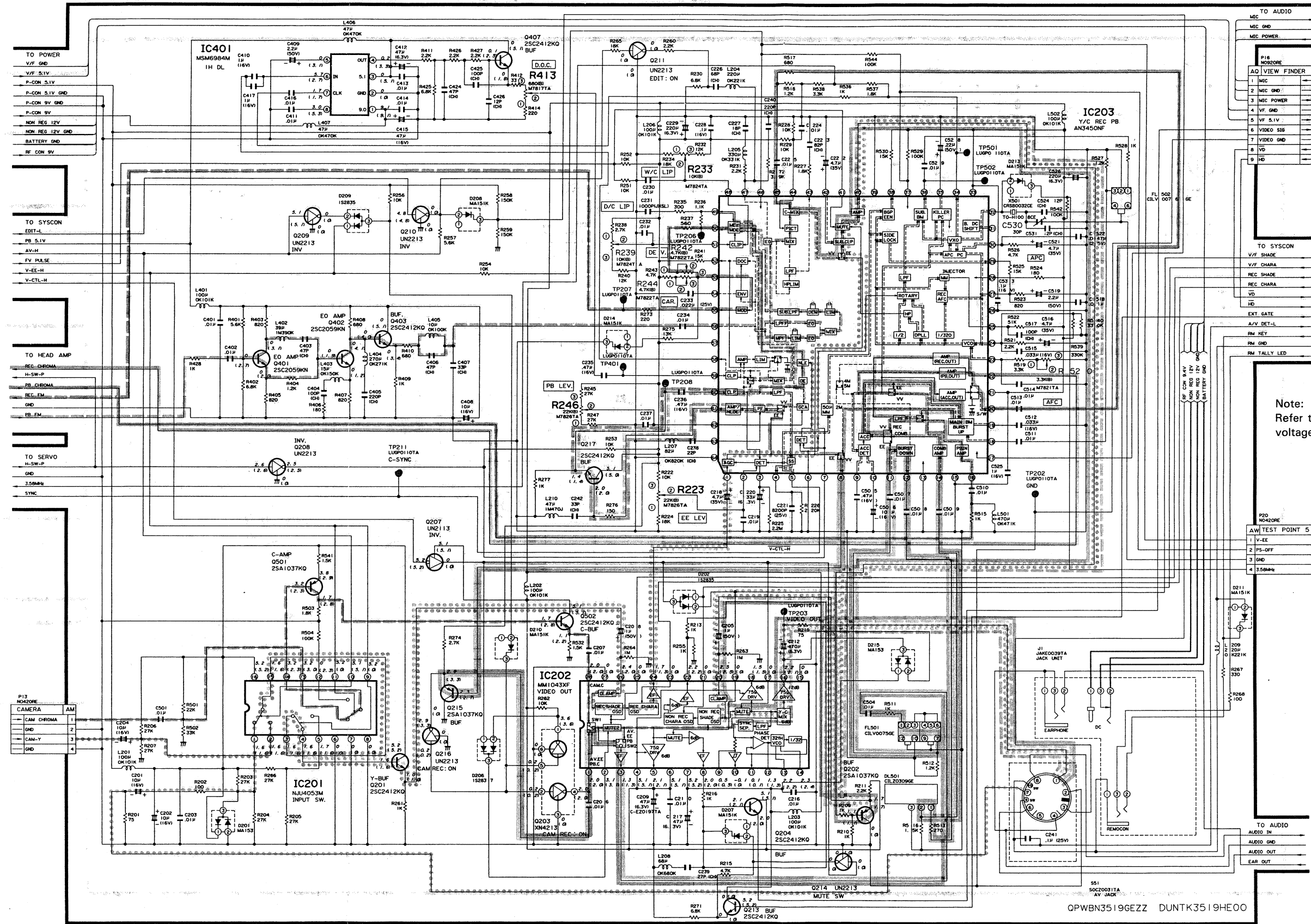
REC Y Signal

PB Y Signal

CAM C EE Signal

REC C Signal

PB C Signal

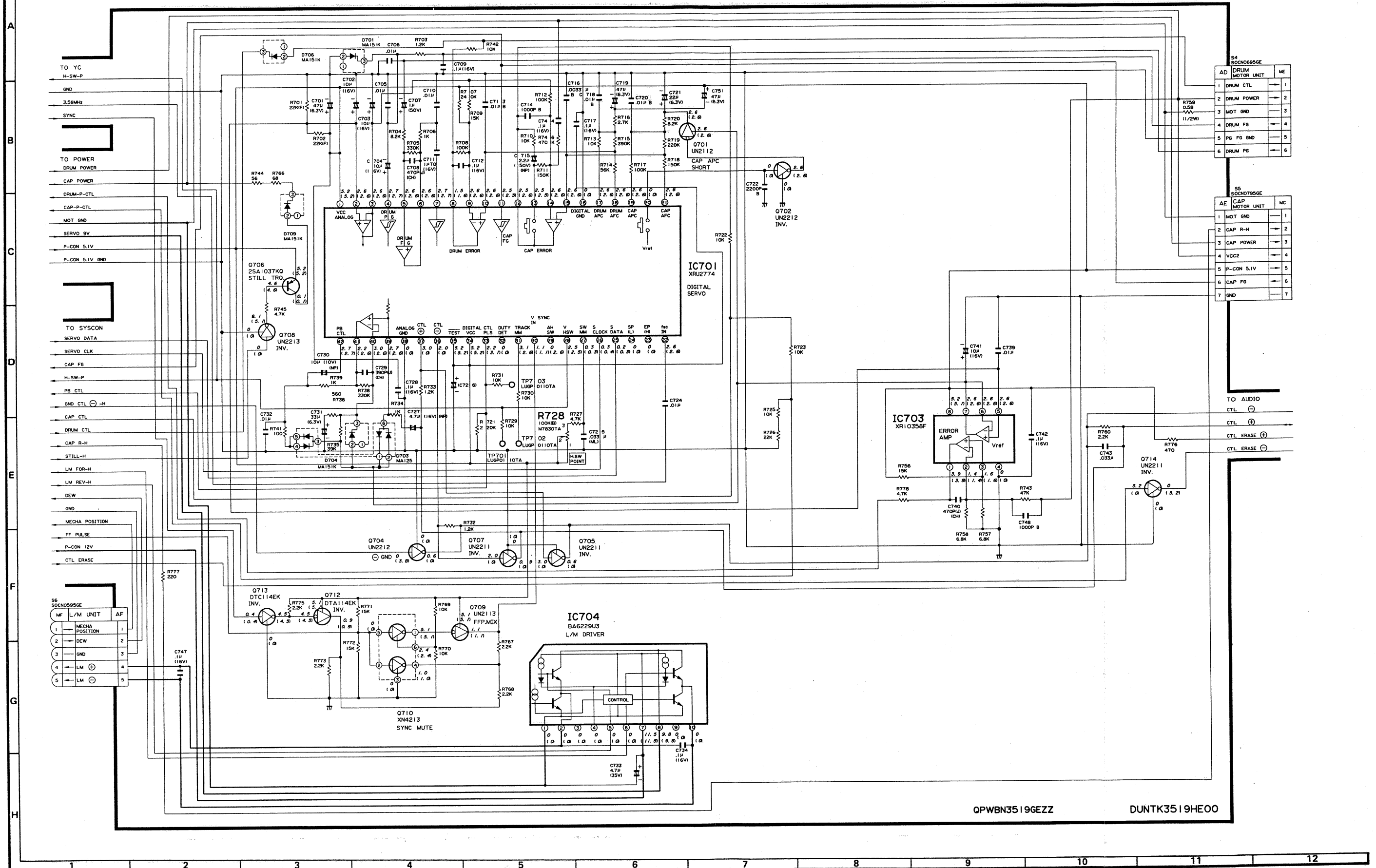


Note:
Refer to the page 107 for the voltage of IC203.

P20 NO420RE	
AW	TEST POINT 5
1	V-EE
2	PS-OFF
3	GND
4	3.58MHz

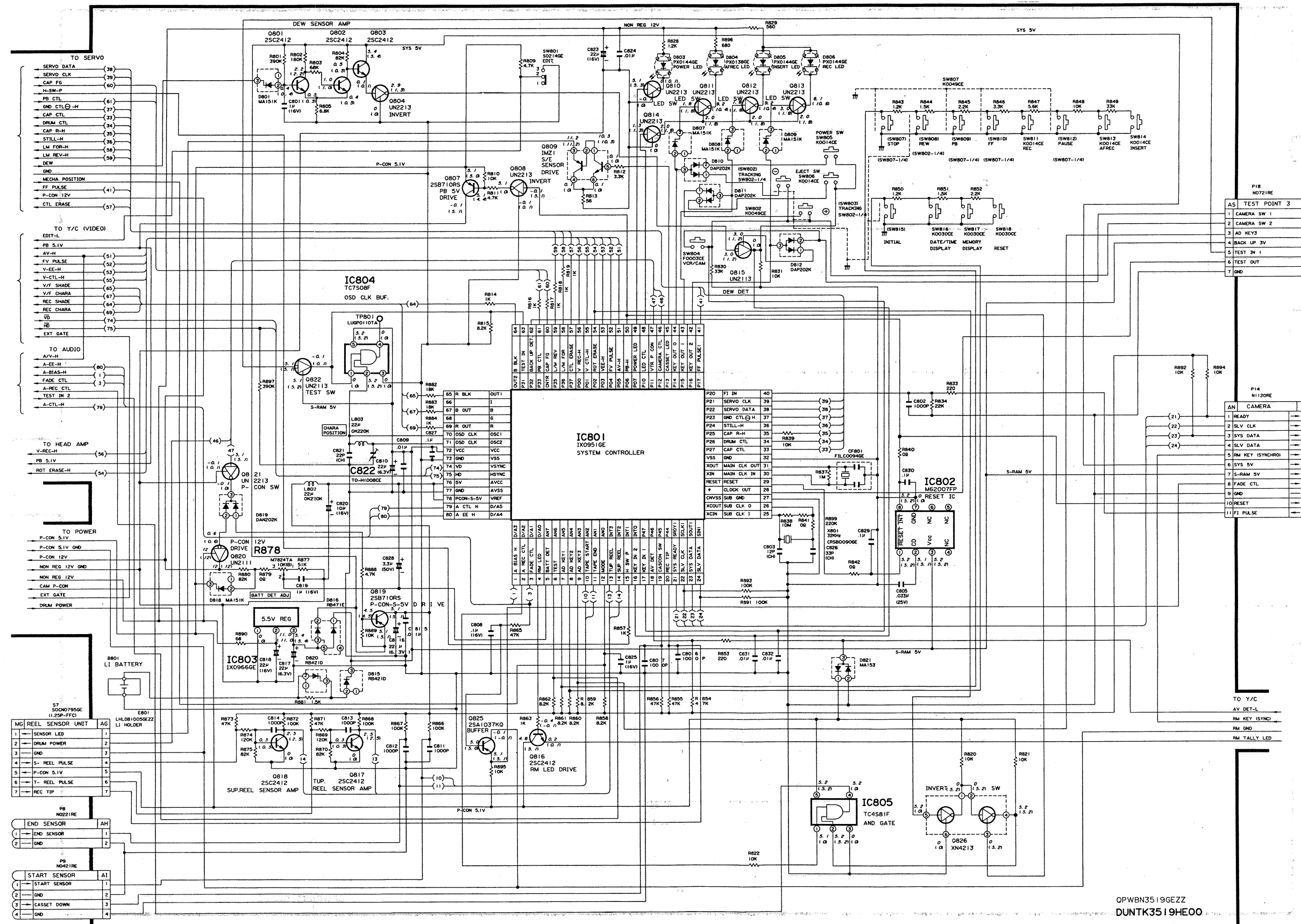
QPWBN3519GEZZ DUNTK3519HE00

SERVO CIRCUIT SCHEMATIC DIAGRAM



SYSTEM CONTROL CIRCUIT SCHEMATIC DIAGRAM

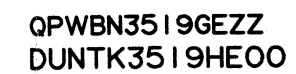
Note: Refer to the page 108 for the voltage of IC801.



OPWB3519GEZZ

DUNT3519HEOO

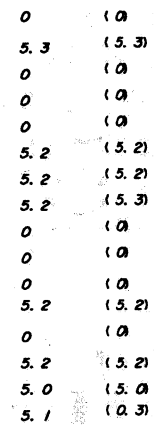
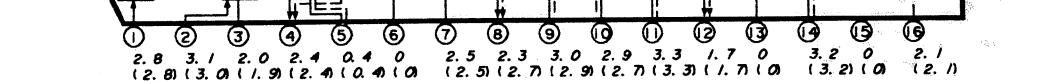
PB Signal



△ AND SHADED COMPONENTS = SAFETY RELATED PARTS



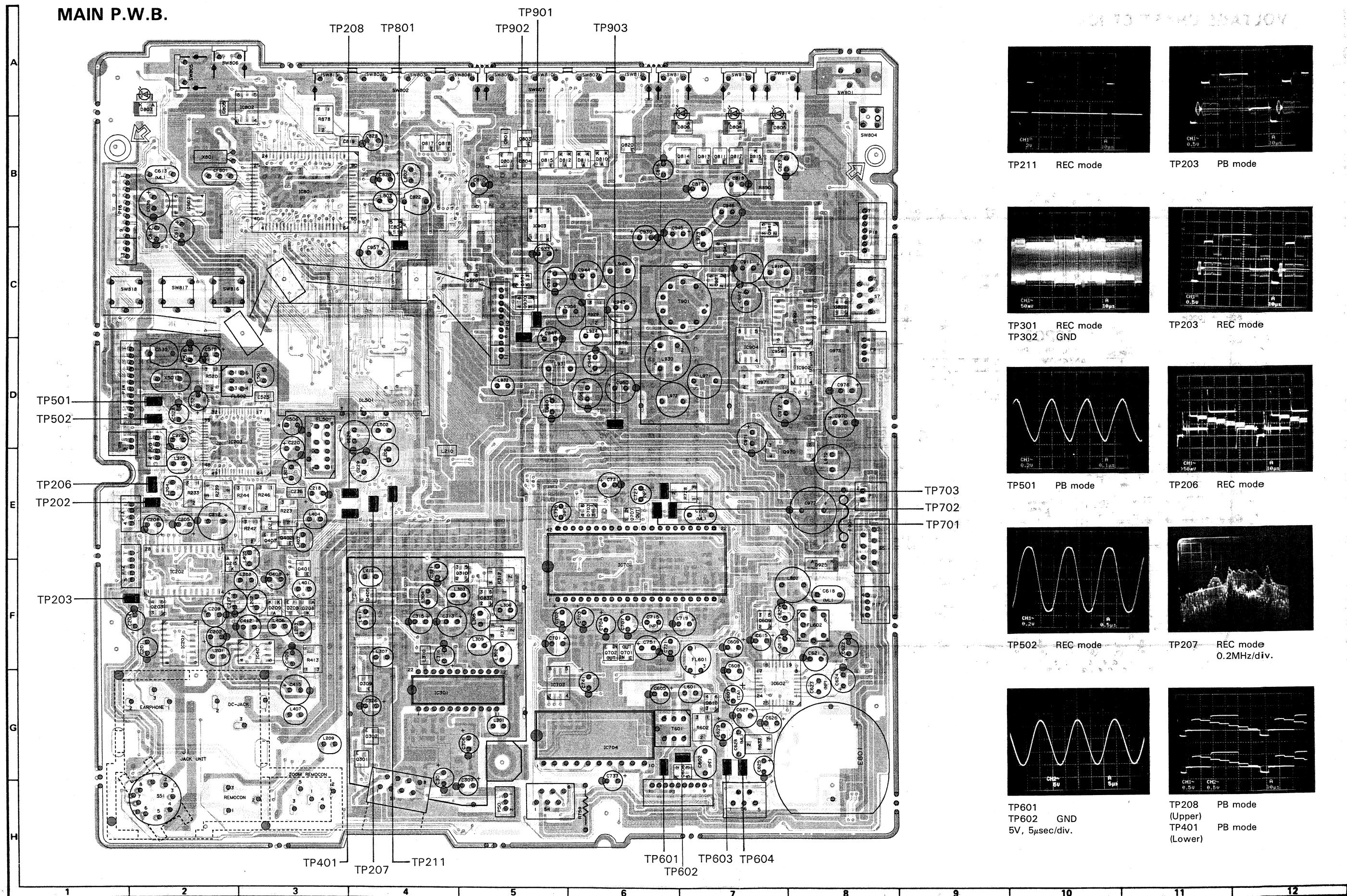
A
B
C
D
E
F
G
H

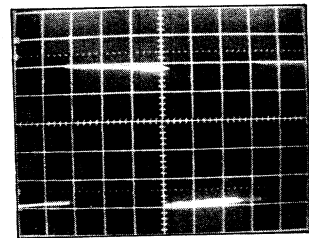
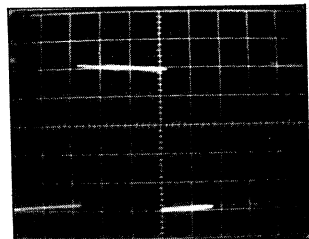
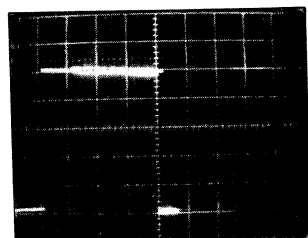
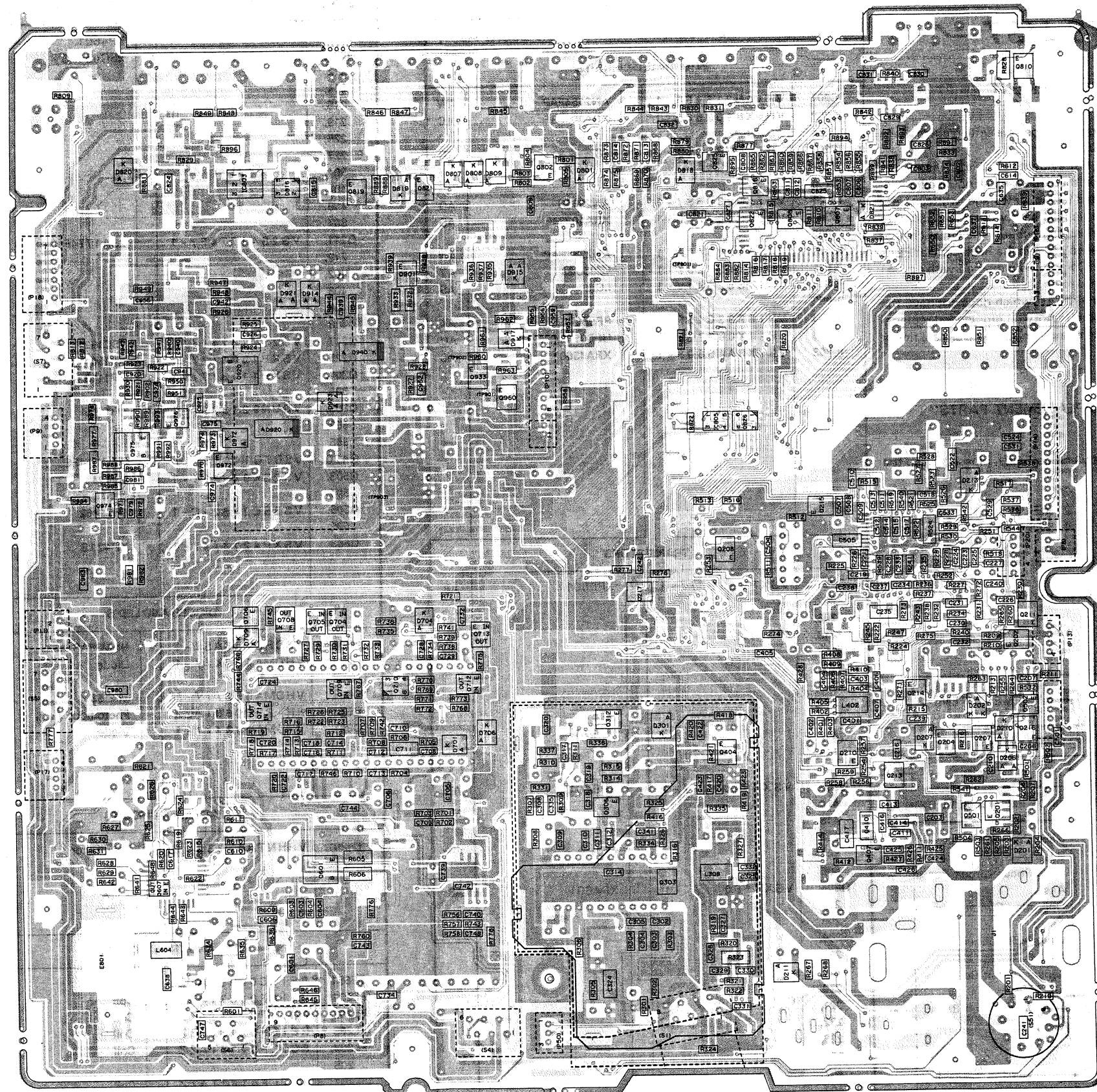


1	A	BIAS	H	D/A3
2	A	REC	CTL	D/A2
3	FADE	CTL	D/A1	
4	RM	LED	D/A0	
5	BATT	DET	AN7	
6	TEST	AN6		
7	AD	KEY1	AN5	
8	AD	KEY2	AN4	
9	AD	KEY3	AN3	
10	TAPE	START	AN2	
11	TAPE	END	AN1	
12	MODE	ANO		
13	TUP	REEL	INT3	
14	SUP	REEL	INT2	
15	H	SW P	INT1	
16	KEY	IN 2	INT0	
17	KEY	IN 1	P47	
18	AV	DET	P46	
19	CASCON	SW	P45	
20	REC	TIP	P44	
21	SYS	READY	SRDY1	
22	SLV	CLK	SCLK1	
23	SYS	DATA	SOUT1	
24	SLV	DATA	SINI	

P20	FI IN	40	0	(0)
P21	SERVO CLK	39	0.2	(0.1)
P22	SERVO DATA	38	0.1	(0.1)
P23	GND CTL $\ominus$ H	37	0	(5.2)
P24	STILL-H	36	0	(0)
P25	CAP R-H	35	0	(0)
P26	DRUM CTL	34	1.2	(1.2)
P27	CAP CTL	33	2.1	(2.1)
VSS	GND	32	0	(0)
XOUT	MAIN CLK OUT	31	2.5	(2.3)
XIN	MAIN CLK IN	30	2.3	(2.2)
RESET	RESET	29	5.2	(5.2)
Φ	CLOCK OUT	28	5.3	(5.3)
CNVSS	SUB GND	27	0	(0)
XCOUT	SUB CLK 0	26	0.7	0.7
XCIN	SUB CLK 1	25	1.2	(1.2)

MAIN P.W.B.



TP701 1V, 5msec/div
REC modeTP702 1V, 5msec/div
REC modeTP703 1V, 5msec/div
REC mode

PARTS LIST			
PARTS REPLACEMENT			
Many electrical and mechanical parts in video cassette recorder have special safety-related characteristics. These characteristics are often not evident from visual inspection nor can be protection afforded by them necessarily obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have special safety characteristics are identified in this manual, electrical components having such features are identified by Δ and shaded areas in the Replacement Parts Lists and Schematic Diagrams. Components marked with an (▲) are related to X-Ray protection circuit. The use of a substitute replacement part which does not have the same safety characteristics as the factory recommended replacement parts shown in this service manual may create shock, fire or other hazards.			
“HOW TO ORDER REPLACEMENT PARTS”			
To have your order filled promptly and correctly, please furnish the following informations.			
1. MODEL NUMBER 2. REF. NO. 3. PART NO. 4. DESCRIPTION			
Contact your nearest SHARP Parts Distributor to order.			
For location of SHARP Parts Distributor, Please call Toll-Free; 800-447-4700			
PWB ASSEMBLY IS NOT REPLACEMENT ITEM			
Δ MARK: SAFETY RELATED PARTS			
Ref. No.	Part No.	★	Description
PRINTED WIRING BOARD ASSEMBLY (NOT REPLACEMENT ITEM)			
	DUNTK2226PM03		Camera Main Circuit Board Ass'y
	DUNTK2227PM00		Auto Focus Circuit Board Ass'y
	DUNTK2228RA00		Operation Circuit Board Ass'y
	DUNTK2230PM00		Viewfinder Circuit Board Ass'y
	DUNTK2262PM00		Sensor Circuit Board Ass'y
	DUNTK3519HE00		VCR Main Circuit Board Ass'y

Ref. No.	Part No.	★	Description	Code
DUNTK2226PM03 Camera Main Circuit Board Ass'y				
INTEGRATED CIRCUITS				
IC201	VH i AN2154FA - 1		AN2154FAP	AW
IC202, 654	VH i XR10358F - 1		XRA10358F	AC
IC203, 204, 205	VH i MSM6850M - 1		I.C.	AN
IC301	VH i AN2365S / - 1		AN2365S	AQ
IC302, 802	VH i XR10324F - 1		XRA10324F	AD
IC401	VH i AN2254FA - 1		AN2254FAP	AW
IC501	VH i LZ95D23 / - 1		LZ95D23	AT
IC651, 652	VH i MB88341V - 1		I.C.	AS
IC653	VH i BR93C46F - 1		BR93C46F	AK
IC655	RH - i X0637GEZZ		UPD75104GF-748	AU
IC803	VH i XRA4560F - 1		XRA4560F	AC
TRANSISTORS				
Q201, 202, 206, 218, 228, 302, 401, 406, 411, 412, 413, 415	VSXP6501 / - 1		XP6501	AB
Q203, 414, 416, 803, 804, 806	VSXP6401 / - 1		XP6401	AB
Q204, 207, 208, 209, 210, 215, 220, 221, 222, 223, 224, 407, 409, 410, 417, 801, 808,	VSXP4601 / - 1		XP4601	AB

Ref. No.	Part No.	★	Description	Code
Q809	VSXP4601 / - 1		XP4601	AB
Q205, 212, 214, 216, 219, 226, 227, 304, 404, 419, 807	VS2SC4617B / - 1		2SC4617B	AA
Q211, 213, 402, 403, 408, 418	VS2SA1774F / - 1		2SA1774F	AA
Q217	VS2SC1621 / - 1E		2SC1621	AD
Q225	VSXP1501 / - 1		XP1501	AB
Q301, 305	VSXP1113 / - 1		XP1113	AB
Q303, 652, 805	VSUN9213 / - 1		UN9213	AA
Q420	VSDTC144EE / - 1		DTC144EE	AA
Q503, 504	VS2SK94 - X3 / - 1		2SK94	AC
Q505, 506	VS2SC2462 - C - 1		2SC2462	AB
Q653	VSXP4213 / - 1		XP4213	AB
DIODES AND LED'S				
D301	VHDHSM88AS / - 1		HSM88AS	AC
D302, 652	VHDM132K / - 1		Diode	AA
D401	VHDM153 / - 1		MA153	AB
D651	RH - PX0060TAZZ		Photodiode	AB
D801	VHDM133 / - 1		Diode	AB
PACKAGED CIRCUITS				
TH201, 202	VHHNTA47235 - 1		Thermistor	AC
COIL AND TRANSFORMERS				
CF651	RFILC0035TAZZ		Filter	AD
FL201	RCILF0187TAZZ		Coil	AH
FL202	RCILF0159TAZZ		Coil	AH
FL203	RCILF0213TAZZ		Coil	AH
FL204, 205	RCILF0212TAZZ		Coil	AE
FL401	RCILF0161TAZZ		Coil	AH
L201	VP - 1M180K2R5N		Peaking 18μH 10%	AC
L202	VP - 1M820K7R7N		Peaking 82μH 10%	AC
L203, 204, 205,	VP - 1M470K5R4N		Peaking 47μH 10%	AC

Ref. No.	Part No.	★	Description	Code
L206, 301, 503, 651	VP - 1M470K5R4N		Peaking 47μH 10%	AC
L401	VP - 1M330K4R2N		Peaking 33μH 10%	AC
L402	VP - 1M220K2R9N		Peaking 22μH 10%	AC
L403	VP - VM391K120N		Peaking 390μH 10%	AC
CONTROLS				
R290	RVR - M7899TAZZ		Variable Resistor	AC
R437, 715, 716	RVR - M7897TAZZ		Variable Resistor	AC
CAPACITORS				
C201, 260, 431	VCCCCY1HH120J		12pF 50V Ceramic	AA
C202	VCSATE0JJ106M		10μF 6.3V Tantalum, (N.P)	AD
C203	VCSATA0JJ475M		4.7μF 6.3V Tantalum, (N.P)	AC
C204, 210, 211, 220, 238, 240, 246, 248, 255, 256, 401, 404, 406, 407, 408, 409, 410, 414, 416, 418, 419, 420, 421, 423, 425, 428, 508, 652, 664	VCKYCY1HF103Z		0.01μF 50V Ceramic	AA
C205	VCEAPC0GW476M		47μF 4.0V Electrolytic	AB
C206, 207, 223, 226, 262, 304, 310, 405,	VCKYCY1CF104Z		0.1μF 16V Ceramic	AA

★ MARK: SPARE PARTS DELIVERY SECTION

Ref. No.	Part No.	★	Description	Code	Ref. No.	Part No.	★	Description	Code
C804	VCKYCY1CF104Z		0.1μF 16V Ceramic	AA	C261	VCKYTQ1CR224K		0.22μF 16V Ceramic	AC
C208,	VCKYCY1HB102K		1000pF 50V Ceramic	AA	C250,	VCCCCY1HH560J		56pF 50V Ceramic	AA
506,					402,				
818					513,				
C209,	VCKYCY1CF473Z		0.047μF 16V Ceramic	AA	514				
212,					C259	VCCCCY1HH680J		68pF 50V Ceramic	AA
213,					C266	VCE9PC0JW226M		22μF 6.3V Electrolytic, (N.P)	AC
214,									
218,					C267,	VCCCTV1HH471J		470pF 50V Ceramic	AA
432					509				
C215,	VCKYTQ1CR104K		0.1μF 16V Ceramic	AB	C268,	VCCCCY1HH121J		120pF 50V Ceramic	AA
216,					437				
229,					C307,	VCEAPC0JW226M		22μF 6.3V Electrolytic	AC
235,					308,				
257,					313,				
258,					651,				
303,					661				
309,					C312,	VCEAPC1HW105M		1.0μF 50V Electrolytic	AB
314,					812,				
412,					815,				
413,					816				
417,					C403	VCKYTV1CF224Z		0.22μF 16V Ceramic	AB
424,					C411	VCCCCY1HH270J		27pF 50V Ceramic	AA
426					C427	VCCCCY1HH180J		18pF 50V Ceramic	AA
C217	VCCCCY1HH820J		82pF 50V Ceramic	AA	C429	VCEAPC1HW225M		2.2μF 50V Electrolytic	AB
C219,	VCSAPK0JJ476M		47μF 6.3V Tantalum, (N.P)	AD	C430	VCCCCY1HH331J		330pF 50V Ceramic	AA
415,					C507	VCCCCY1HH150J		15pF 50V Ceramic	AA
422					C658	VCKYTQ1CF105Z		1.0μF 16V Ceramic	AC
C221,	VCKYTV1CR473K		0.047μF 16V Ceramic	AB	C659,	VCCCCY1HH330J		33pF 50V Ceramic	AA
222					660				
C224	VCSATE1AJ106M		10μF 10V Tantalum, (N.P)	AD	C808	VCEAPC1CW226M		22μF 16V Electrolytic	AB
					C810	VCE9PC1VW225M		2.2μF 35V Electrolytic, (N.P)	AC
C227,	VCCCCY1HH101J		100pF 50V Ceramic	AA					
434,					C811	VCE9PC1CW475M		4.7μF 16V Electrolytic, (N.P)	AC
436									
C228	VCCCCY1HH271J		270pF 50V Ceramic	AA	RESISTORS				
C230	VCKYTV1EB223K		0.022μF 25V Ceramic	AB	R201	VRS - CY1JF100J		10 0.063W 5% Metal Oxide	AA
C231,	VCEAPC1CW106M		10μF 16V Electrolytic	AB	R202,	VRS - CY1JF433J		43k 0.063W 5% Metal Oxide	AA
264,					320,				
301,					342				
302,					R203,	VRS - CY1JF223J		22k 0.063W 5% Metal Oxide	AA
809					209,				
C233,	VCKYTV1CR683K		0.068μF 16V Ceramic	AB	230,				
433,					319,				
435					427,				
C234,	VCEAPC1VW475M		4.7μF 35V Electrolytic	AB	449,				
242,					452,				
251,					520,				
305,					539,				
311,					688,				
817					706,				
C236,	VCKYCY1EB103K		0.01μF 25V Ceramic	AA	707,				
237,					726,				
244,					749,				
245,					830,				
253,					832				
254					R204,	VRS - CY1JF163J		16k 0.063W 5% Metal Oxide	AA
C239,	VCEAPC0JW476M		47μF 6.3V Electrolytic	AC	210				
247,					R205,	VRS - CY1JF102J		1.0k 0.063W 5% Metal Oxide	AA
263,					240,				
265,					245,				
306,					260,				
505,									
814									
C241,	VCEAPC1CW476M		47μF 16V Electrolytic	AC					
249									
C243,	VCKYTQ1CR224K		0.22μF 16V Ceramic	AC					
252,									

Ref. No.	Part No.	★	Description	Code	Ref. No.	Part No.	★	Description	Code
R261, 262, 266, 285, 294, 298, 303, 308, 322, 323, 325, 326, 403, 406, 436, 446, 478, 480, 529, 674, 675, 676, 677, 713, 714, 717, 718, 719, 731, 732, 739, 804	VRS - CY1JF102J		1.0k 0.063W 5% Metal Oxide	AA	R450, 455, 456, 458, 483, 519, 525, 528, 655, 658, 659, 660, 668, 671, 672, 673, 682, 686, 687, 704, 724, 734, 742, 758, 862	VRS - CY1JF103J		10k 0.063W 5% Metal Oxide	AA
R206, 214, 216, 218, 221, 222, 223, 227, 228, 231, 299, 335, 521, 750	VRS - CY1JF563J		56k 0.063W 5% Metal Oxide	AA	R211, 238, 239, 416, 419, 439, 603, 811, 842, 843	VRS - CY1JF153J		15k 0.063W 5% Metal Oxide	AA
R207, 328, 343, 441, 442, 479, 836, 854	VRS - CY1JF682J		6.8k 0.063W 5% Metal Oxide	AA	R212, R213, 311, 332, 431, 432	VRS - CY1JF224J VRS - CY1JF473J		220k 0.063W 5% Metal Oxide 47k 0.063W 5% Metal Oxide	AA AA
R208, 247, 248, 334, 345, 347, 348, 349, 412, 417, 428, 430, 443, 444	VRS - CY1JF103J		10k 0.063W 5% Metal Oxide	AA	R217, R224	VRS - CY1JF394J VRS - CY1JF623J		390k 0.063W 5% Metal Oxide 62k 0.063W 5% Metal Oxide	AA AA
					R226, 411, 485, 486, 759, 760, 761, 762	VRS - CY1JF184J		180k 0.063W 5% Metal Oxide	AA
					R229, 305, 340, 764, 827, 828	VRS - CY1JF823J		82k 0.063W 5% Metal Oxide	AA
					R232, 263, 272, 301, 302, 517, 852	VRS - CY1JF561J		560 0.063W 5% Metal Oxide	AA

★ MARK: SPARE PARTS DELIVERY SECTION

Ref. No.	Part No.	★	Description	Code	Ref. No.	Part No.	★	Description	Code
R233, 404, 666	VRS - CY1JF331J		330 0.063W 5% Metal Oxide	AA	R727, 735	VRS - CY1JF101J		100 0.063W 5% Metal Oxide	AA
R234, 235, 337, 350, 351	VRS - CY1JF684J		680k 0.063W 5% Metal Oxide	AA	R246, 728	VRS - CY1JF122F		1.2k 0.063W 1% Metal Oxide	AA
R236, 329, 346, 424, 457, 510, 656, 657, 690, 703, 733, 736, 738, 813, 834, 838, 839, 840, 856	VRS - CY1JF562J		5.6k 0.063W 5% Metal Oxide	AA	R249	VRS - CY1JF333F		33k 0.063W 1% Metal Oxide	AA
R237, 269, 440, 680, 810, 817	VRS - CY1JF822J		8.2k 0.063W 5% Metal Oxide	AA	R250, 352	VRS - CY1JF274J		270k 0.063W 5% Metal Oxide	AA
R241, 267, 280, 292, 297, 433, 447, 448, 467, 469, 472, 489, 602, 705, 729, 755, 849	VRS - CY1JF222J		2.2k 0.063W 5% Metal Oxide	AA	R252, 257, 276, 283, 284, 468, 702, 722, 748	VRS - CY1JF272J		2.7k 0.063W 5% Metal Oxide	AA
R242	VRS - CY1JF124J		120k 0.063W 5% Metal Oxide	AA	R253, 277, 408	VRS - CY1JF112F		1.1k 0.063W 1% Metal Oxide	AA
R243, 313, 317, 333, 425	VRS - CY1JF393J		39k 0.063W 5% Metal Oxide	AA	R255	VRS - CY1JF123F		12k 0.063W 1% Metal Oxide	AA
R244, 273, 429, 445, 518, 526, 532, 534, 541, 544, 708, 711,	VRS - CY1JF101J		100 0.063W 5% Metal Oxide	AA	R256	VRS - CY1JF512F		5.1k 0.063W 1% Metal Oxide	AA
					R258	VRS - CY1JF132F		1.3k 0.063W 1% Metal Oxide	AA
					R259	VRS - CY1JF911F		910 0.063W 1% Metal Oxide	AA
					R264, 685, 746	VRS - CY1JF333J		33k 0.063W 5% Metal Oxide	AA
					R265, 271, 281, 282, 414, 466, 709, 710, 720, 744, 745, 756, 757	VRS - CY1JF182J		1.8k 0.063W 5% Metal Oxide	AA
					R268, 535, 536, 812, 847	VRS - CY1JF123J		12k 0.063W 5% Metal Oxide	AA
					R270	VRS - CY1JF752F		7.5k 0.063W 1% Metal Oxide	AA
					R274, 454	VRS - CY1JF152J		1.5k 0.063W 5% Metal Oxide	AA
					R275	VRS - CY1JF622F		6.2k 0.063W 1% Metal Oxide	AA
					R279, 421	VRS - CY1JF681F		680 0.063W 1% Metal Oxide	AA
					R286, 293, 296, 515, 712	VRS - CY1JF821J		820 0.063W 5% Metal Oxide	AA
					R287, 289, 291, 324, 327, 460,	VRS - CY1JF122J		1.2k 0.063W 5% Metal Oxide	AA

Ref. No.	Part No.	★	Description	Code	Ref. No.	Part No.	★	Description	Code
R461, 463, 465, 476, 477, 481, 482, 509, 730, 747, 841	VRS - CY1JF122J		1.2k 0.063W 5% Metal Oxide	AA	R538, 721, 835 R415	VRS - CY1JF332J		3.3k 0.063W 5% Metal Oxide	AA
R295	VRS - CY1JF181J		180 0.063W 5% Metal Oxide	AA	R434, 438, 471, 474, 475, 530, 803, 816, 819, 826	VRS - CY1JF391J		390 0.063W 5% Metal Oxide	AA
R307, 413, 821, 844	VRS - CY1JF183J		18k 0.063W 5% Metal Oxide	AA	R487, 488 R511	VRS - CY1JF392J		3.9k 0.063W 5% Metal Oxide	AA
R310	VRS - CY1JF513J		51k 0.063W 5% Metal Oxide	AA	R462, 464	VRS - CY1JF302J		3.0k 0.063W 5% Metal Oxide	AA
R312, 318, 802	VRS - CY1JF683J		68k 0.063W 5% Metal Oxide	AA	R487, 488 R511	VRS - CY1JF202J		2.0k 0.063W 5% Metal Oxide	AA
R316, 321, 330, 341, 410, 451, 516, 669, 678, 679, 801, 814, 818, 820, 831, 833, 850, 853	VRS - CY1JF104J		100k 0.063W 5% Metal Oxide	AA	R512	VRS - CY1JF133J		13k 0.063W 5% Metal Oxide	AA
R336, 723	VRS - CY1JF273J		27k 0.063W 5% Metal Oxide	AA	R513	VRS - CY1JF243J		24k 0.063W 5% Metal Oxide	AA
R338	VRS - CY1JF564J		560k 0.063W 5% Metal Oxide	AA	R514, 670	VRS - CY1JF752J		7.5k 0.063W 5% Metal Oxide	AA
R339	VRS - CY1JF113J		11k 0.063W 5% Metal Oxide	AA	R514, 670	VRS - CY1JF221J		220 0.063W 5% Metal Oxide	AA
R401, 423, 484, 531, 605, 606, 607, 608, 609, 689, 837	VRS - CY1JF000J		00 0.063W 5% Metal Oxide	AA	R661	RR - TZ0098GEZZ		Resistor	AA
R402, 522, 542, 701	VRS - CY1JF471J		470 0.063W 5% Metal Oxide	AA	R725	VRS - CY1JF301F		300 0.063W 1% Metal Oxide	AA
R405, 743	VRS - CY1JF681J		680 0.063W 5% Metal Oxide	AA	R737	VRS - CY1JF271J		270 0.063W 5% Metal Oxide	AA
R407, 453, 470, 473, 537	VRS - CY1JF332J		3.3k 0.063W 5% Metal Oxide	AA	R740	VRS - CY1JF391F		390 0.063W 1% Metal Oxide	AA
					R741	VRS - CY1JF101F		100 0.063W 1% Metal Oxide	AA
					R815	VRS - CY1JF225J		2.2M ohm 0.063W 5% Metal Oxide	AA
					R822	VRS - CY1JF105J		1M ohm 0.063W 5% Metal Oxide	AA
					R845, 846	VRS - CY1JF103F		10k 0.063W 1% Metal Oxide	AA
					R848	VRS - CY1JF682F		6.8k 0.063W 1% Metal Oxide	AA
					R851	VRS - CY1JF183F		18k 0.063W 1% Metal Oxide	AA
					R855	VRS - CY1JF332F		3.3k 0.063W 1% Metal Oxide	AA
					R857	VRS - CY1JF822F		8.2k 0.063W 1% Metal Oxide	AA
					R858	VRS - CY1JF154J		150k 0.063W 5% Metal Oxide	AA
					MISCELLANEOUS PARTS				
					P401, 901	QCNW-1058TAZZ QPLGN0460TAZZ		Connecting Cord Plug	AG AC
					P701	QPLGN1160TAZZ		Plug	AD
					P702	QPLGN0960TAZZ		Plug	AD
					P703	QCNCW2044TAZZ		Connector	AE
					P704	QCNCW3044TAZZ		Connector	AF
					P710	QPLGZ0090TAZZ		Plug	AB
					SW651	QSW-K0014CEZZ		Switch	AC
					SW652	QSW-K0082GEZZ		Switch	AD

★ MARK: SPARE PARTS DELIVERY SECTION

Ref. No.	Part No.	★	Description	Code	Ref. No.	Part No.	★	Description	Code
S201 S202	QSO CN0639TAZZ QSO CN1439TAZZ		Socket Socket	AD AF	COIL AND TRANSFORMERS				
					L901, 903, 904	VP - 1M220K2R9N		Peaking 22μH 10%	AC
CABINET PARTS					CONTROLS				
TP201, 202, 203, 501, 502	QLUGP0110TAFW		Lug	AA	R971	RVR - M7897TAZZ		Variable Resistor	AC
DUNTK2227PM00 Auto Focus Circuit Board Ass'y					CAPACITORS				
INTEGRATED CIRCUITS					C1, 4, 914, 922, 934	VCEAPC1CW106M		10μF 16V Electrolytic	AB
IC1, 907, 909	VH iXR10358F - 1		XRA10358F	AC	C2 C3,	VCEAPC1CW226M VCKYCY1CF104Z		22μF 16V Electrolytic 0.1μF 16V Ceramic	AB AA
IC901	RH - iX0121TAZZ		I.C.	AS	921, 924,				
IC902	RH - iX0116TAZZ		LZ93G29	AY	930,				
IC903	VH iMSM6219M - 1		MSM6219MS-K	AP	932, 933				
IC904	VH iLAG655F / - 1		I.C.	AM	C901,	VCKYCY1HF103Z		0.01μF 50V Ceramic	AA
IC905	VH iMM1036F / - 1		I.C.	AG	902, 913, 920, 923, 926, 927, 936, 938, 939, 940, 942, 943, 946				
IC906, 910	VH iXR10393F - 1		XRA10393F	AC	C903	VCKYCY1HB222K		2200pF 50V Ceramic	AA
IC908	VH iXRU4053F - 1		XRU4053BF	AE	C904	VCEAPC0JW476M		47μF 6.3V Electrolytic	AC
TRANSISTORS					C905,	VCCCCY1HH680J		68pF 50V Ceramic	AA
Q1, 2	VSXN4601 / - 1		XN4601	AB	906, 907				
Q3, 6	VS2SD2118 / - 1		2SD2118	AC	C908,	VCCCCY1HH101J		100pF 50V Ceramic	AA
Q4	VS2SB1132Q / - 1		2SB1132Q	AC	917	VCKYTV1CF224Z		0.22μF 16V Ceramic	AB
Q5, 913	VSUN9213 / - 1		UN9213	AA	C909,	VCCCCY1HH271J		270pF 50V Ceramic	AA
Q904	VSXP6501 / - 1		XP6501	AB	918	VCCCCY1HH150J		15pF 50V Ceramic	AA
Q905, 906, 908, 911	VSXP4601 / - 1		XP4601	AB	C911, 919	VCCCCY1HH331J		330pF 50V Ceramic	AA
Q907, 912	VS2SC4617B / - 1		2SC4617B	AA	C915, 916	VCCCCY1HH331J		330pF 50V Ceramic	AA
DIODES AND LED'S					C928	VCKYCY1EB103K		0.01μF 25V Ceramic	AA
D901, 902	VH DMA132K / - 1		Diode	AA	C931	VCSAPB1CJ106M		10μF 16V Tantalum, (N.P)	AE
D903, 904	VH DMA143 / - 1		MA143	AB	C935, 944	VCEAPC0JW226M		22μF 6.3V Electrolytic	AC
					C937	VCKYTQ1CF474Z		0.47μF 16V Ceramic	AB
					C945	VCEAPC1CW476M		47μF 16V Electrolytic	AC

Ref. No.	Part No.	★	Description	Code	Ref. No.	Part No.	★	Description	Code
RESISTORS					R913, 967	VRS - CY1JF123J		12k 0.063W 5% Metal Oxide	AA
R1, 2, 986	VRS - CY1JF153J		15k 0.063W 5% Metal Oxide	AA	R914	VRS - CY1JF683J		68k 0.063W 5% Metal Oxide	AA
R3, 6	VRS - CY1JF274J		270k 0.063W 5% Metal Oxide	AA	R915, 916, 920, 927, 969	VRS - CY1JF152J		1.5k 0.063W 5% Metal Oxide	AA
R4, 929, 937	VRS - CY1JF122J		1.2k 0.063W 5% Metal Oxide	AA	R917	VRS - CY1JF112J		1.1k 0.063W 5% Metal Oxide	AA
R5	VRS - CY1JF243F		24k 0.063W 1% Metal Oxide	AA	R918	VRS - CY1JF471J		470 0.063W 5% Metal Oxide	AA
R7, 8, 14, 15, 20, 907, 908, 936, 942, 943, 949, 950, 951, 958, 959, 988, 989, 992	VRS - CY1JF103J		10k 0.063W 5% Metal Oxide	AA	R919	VRS - CY1JF822J		8.2k 0.063W 5% Metal Oxide	AA
R9, 10, 977, 987	VRS - CY1JF223J		22k 0.063W 5% Metal Oxide	AA	R921, 922, 923	VRS - CY1JF911J		910 0.063W 5% Metal Oxide	AA
R11, 928, 990	VRS - CY1JF682J		6.8k 0.063W 5% Metal Oxide	AA	R924, 935	VRS - CY1JF104J		100k 0.063W 5% Metal Oxide	AA
R12, 944, 945	VRS - CY1JF221J		220 0.063W 5% Metal Oxide	AA	R925, 979, 985	VRS - CY1JF000J		00 0.063W 5% Metal Oxide	AA
R13	VRS - TV1JD3R9J		3.9 0.063W 5% Metal Oxide	AA	R926	VRS - CY1JF332J		3.3k 0.063W 5% Metal Oxide	AA
R16, 24, 978	VRS - CY1JF273J		27k 0.063W 5% Metal Oxide	AA	R930, 965	VRS - CY1JF392J		3.9k 0.063W 5% Metal Oxide	AA
R17, 22, 25	VRS - TV1JD2R2J		2.2 0.063W 5% Metal Oxide	AA	R931, 932, 933, 934, 946, 956, 982	VRS - CY1JF472J		4.7k 0.063W 5% Metal Oxide	AA
R18, 23, 902	VRS - CY1JF182J		1.8k 0.063W 5% Metal Oxide	AA	R938, 955	VRS - CY1JF101J		100 0.063W 5% Metal Oxide	AA
R21	VRS - TV1JD272J		2.7k 0.063W 5% Metal Oxide	AA	R939	VRS - CY1JF393F		39k 0.063W 1% Metal Oxide	AA
R901	VRS - CY1JF134J		130k 0.063W 5% Metal Oxide	AA	R940, 941	VRS - CY1JF333F		33k 0.063W 1% Metal Oxide	AA
R903, 964	VRS - CY1JF821J		820 0.063W 5% Metal Oxide	AA	R948	VRS - CY1JF222J		2.2k 0.063W 5% Metal Oxide	AA
R909, 947, 970, 983	VRS - CY1JF102J		1.0k 0.063W 5% Metal Oxide	AA	R952, 953, 974, 975	VRS - CY1JF473J		47k 0.063W 5% Metal Oxide	AA
R910, 991	VRS - CY1JF183J		18k 0.063W 5% Metal Oxide	AA	R962, 963, 984	VRS - CY1JF271J		270 0.063W 5% Metal Oxide	AA
R911	VRS - CY1JF224J		220k 0.063W 5% Metal Oxide	AA	R972	VRS - CY1JF391J		390 0.063W 5% Metal Oxide	AA
R912	VRS - CY1JF124J		120k 0.063W 5% Metal Oxide	AA	R973, 976	VRS - CY1JF563J		56k 0.063W 5% Metal Oxide	AA
					R993	VRS - CY1JF154J		150k 0.063W 5% Metal Oxide	AA
					R996	VRS - CY1JF513J		51k 0.063W 5% Metal Oxide	AA
					MISCELLANEOUS PARTS				
					P601	QCNCW1844TAZZ		Connector	AE
					P606	QPLGN0360TAZZ		Plug	AC
					P705	QCNCM2040TAZZ		Connector	AD
					P706	QCNCM3040TAZZ		Connector	AE
					P709	QPLGN0860TAZZ		Plug	AD

★ MARK: SPARE PARTS DELIVERY SECTION

Ref. No.	Part No.	★	Description	Code	Ref. No.	Part No.	★	Description	Code
S701	QSO CN1439TAZZ		Socket	AF	L703 △ T701	RCiLP0090TAZZ RTRNF1852CEZZ		Coil H-VOLT Transformer	AD AU
CABINET PARTS					CONTROLS				
TP901, 902, 903, 904, 905	QLUGP0110TAFW		Lug	AA	R708 R713 R722	RVR-M7803TAZZ RVR-M7789TAZZ RVR-M4042GEZZ		Variable Resistor Variable Resistor Variable Resistor	AC AC AD
DUNTK2228RA00 Operation Circuit Board Ass'y					CAPACITORS				
MISCELLANEOUS PARTS					C701 C703, 714 C704, 705 C706 C707, 711 C708 C709 C710	VCFYHG1HA104J RC-EZ0191TAZZ VCEAEM1HW105M VCKYCY1EB223K RC-EZ0151TAZZ VCEAEM1CW226M VCCCCY1HH101J VCSAPD1VJ334M		0.1μF 50V Capacitor 1.0μF 50V Electrolytic 0.022μF 25V Ceramic Capacitor 22μF 16V Electrolytic 100pF 50V Ceramic 0.33μF 35V Tantalum, (N.P) Capacitor 47μF 6.3V Electrolytic Capacitor 0.033μF 50V Ceramic Capacitor 120pF 50V Ceramic 1000pF 50V Ceramic	AB AC AB AA AB AA AD AB AB AC AB AC AA AA
SW1 SW2 SW3, 4, 5, 6, 7, 11 S1	QSW-S0216GEZZ QSW-S0189GEZZ QSW-K0064GEZZ QSO CN1431REZZ		Switch Switch Switch Socket	AD AD AC AE	C712 C713 △ C715 C716 △ C717 C718 C719	RC-EZ0156TAZZ VCEAEM0JW476M RC-QZ0028TAZZ VCKYTQ1HB333K RC-FZ0002TAZZ VCCCCY1HH121J VCKYCY1HB102K			
DUNTK2230PM00 Viewfinder Circuit Board Ass'y					RESISTORS				
INTEGRATED CIRCUITS					R701 R702 R705 R706, 721 R707 R710 R711 R714 R715 R716 R717 R718 R719	VRS-CY1JF333F VRS-TQ2BD330J VRS-CY1JF242J VRS-CY1JF105J VRS-CY1JF104J VRS-CY1JF162F VRS-CY1JF362F VRS-TV1JD5R6J VRS-CY1JF564J VRS-CY1JF563J VRS-CY1JF392J VRS-TQ2BD561J VRS-CY1JF223J		33k 0.063W 1% Metal Oxide 33 1/8W 5% Metal Oxide 2.4k 0.063W 5% Metal Oxide 1M ohm 0.063W 5% Metal Oxide 100k 0.063W 5% Metal Oxide 1.6k 0.063W 1% Metal Oxide 3.6k 0.063W 1% Metal Oxide 5.6 0.063W 5% Metal Oxide 560k 0.063W 5% Metal Oxide 56k 0.063W 5% Metal Oxide 3.9k 0.063W 5% Metal Oxide 560 1/8W 5% Metal Oxide 22k 0.063W 5% Metal Oxide	AA AA AA AA AA AA AA AA AA AA AA AA AA
IC701	VHIAN2514S/-1		AN2514S-(T1)	AK					
TRANSISTORS									
Q701 △ Q702 Q703	VS2SB792R// -1 VS2SD2115L/-1 VS2SA1586// -1		2SB792 2SD2115L 2SA1586	AD AE AA					
DIODES AND LED'S									
D701, 702 D703 △ D704 △ D705	VH DMA152K//1E VH DMA151K// -1 RH-DX0066GEZZ RH-DX0169TAZZ		MA152K MA151K AU01ZV1 Diode	AC AB AB AC					
COIL AND TRANSFORMERS									
△ L702	RCiLZ0268TAZZ		Coil	AG					

Ref. No.	Part No.	★	Description	Code	Ref. No.	Part No.	★	Description	Code
R723	VRS - CY1 JF124J		120k 0.063W 5% Metal Oxide	AA	DIODES AND LED'S				
R724	VRS - CY1 JF331J		330 0.063W 5% Metal Oxide	AA	D102	VH DMA 133 / / - 1		Diode	AB
R726	VRS - CY1 JF300J		30 0.063W 5% Metal Oxide	AA	D103, 109, 110, 111	VH DMA 132 K / / - 1		Diode	AA
△ R728, △ 729	VRS - TQ2 BD106J		10M ohm 1/8W 5% Metal Oxide	AA	D104	VH DMA 132 WA / - 1		Diode	AA
R730	VRS - CY1 JF471J		470 0.063W 5% Metal Oxide	AA	D105, 106	VH D1S2837 / / 1E		1S2837	AC
R731	VRS - CY1 JF101J		100 0.063W 5% Metal Oxide	AA	PACKAGED CIRCUITS				
R732	VRS - TV1 JD101J		100 0.063W 5% Metal Oxide	AA	X101	RCRSZ0007GEZZ		Crystal	AS
R733, 735, 736, 739	VRS - TV1 JD000J		00 0.063W 5% Metal Oxide	AA	COIL AND TRANSFORMERS				
R734, 737, 738, 740, 741, 742, 743, 744	VRS - TQ2 BD000J		00 1/8W 5% Metal Oxide	AA	FL101	RCILi0306TAZZ		IF Coil	AF
R745	VRS - TQ2 BD2R2J		2.2 1/8W 5% Metal Oxide	AA	L101, 102, 103, 105	VP - 1M1R0MR50N		Peaking 1μH 20%	AC
MISCELLANEOUS PARTS					L104	VP - 1MR47MR38N		Peaking 0.47μH 20%	AC
P701	QPLGN0620REZZ		Plug	AB	L106	VP - 1M100K1R6N		Peaking 10μH 10%	AC
P702	QPLGN0428TAZZ		Plug	AB	L107, 108	VP - 1M680K6R9N		Peaking 68μH 10%	AC
P703	QPLGN0528TAZZ		Plug	AB	L109, 110	VP - 1MR68MR46N		Peaking 0.68μH 20%	AC
DUNTK2262PM00 Sensor Circuit Board Ass'y (IC103 is not included.)					CONTROLS				
INTEGRATED CIRCUITS					R115	RVR - M7895TAZZ		Variable Resistor	AC
IC101	VHi LZ95D22 / - 1		LZ95D22	AT	R126	RVR - M7906TAZZ		Variable Resistor	AC
IC102	VHi CXD1250M - 1		CXD1250M	AU	CAPACITORS				
IC103	VHi LZ2113 / - 1		CCD Sensor	BQ	C101, 102, 103, 104, 106	VCCCCY1HH470J		47pF 50V Ceramic	AA
IC104	VHi IR3P66 / - 1		IR3P66	AG	C105, 108, 109, 110, 111	VCCCCY1HH220J		22pF 50V Ceramic	AA
IC105	VHi NJM79L091E		I.C.	AE	C107, 109, 112, 116, 158, 180	VCKYCY1HB102K		1000pF 50V Ceramic	AA
IC109	VHi M5236ML / - 1		M5236ML	AE	C117, 120, 124,	VCKYCY1EB103K		0.01μF 25V Ceramic	AA
TRANSISTORS									
Q101	VS2SB956R / - 1		2SB956R	AC					
Q103, 105, 106	VS2SC4617B / - 1		2SC4617B	AA					
Q104	VSXP1501 / - 1		XP1501	AB					
Q107	VS2SK160 / - 1		2SK160	AD					
Q108	VS2SC2712Y / - 1		2SC2712	AB					
Q109, 112	VS2SC3735 / - 1		2SC3735	AC					
Q110, 111	VS2SA1462 / - 1		2SA1462	AC					

★ MARK: SPARE PARTS DELIVERY SECTION

Ref. No.	Part No.	★	Description	Code	Ref. No.	Part No.	★	Description	Code
C125, 148, 159, 161, 172, 173, 184	VCKYCY1EB103K		0.01μF 25V Ceramic	AA	R123	VRS - CY1JF271J		270 0.063W 5% Metal Oxide	AA
C123, 164, 166	VCSAPK0JJ476M		47μF 6.3V Tantalum, (N.P)	AD	R124	VRS - CY1JF274J		270k 0.063W 5% Metal Oxide	AA
C126	VCEAPC0JW476M		47μF 6.3V Electrolytic	AC	R125, 133	VRS - CY1JF332J		3.3k 0.063W 5% Metal Oxide	AA
C127, 135	VCKYTV1HF473Z		0.047μF 50V Ceramic	AB	R127	VRS - CY1JF272J		2.7k 0.063W 5% Metal Oxide	AA
C128, 130, 145, 183	VCEAPC1HW335M		3.3μF 50V Electrolytic	AB	R128	VRS - CY1JF393J		39k 0.063W 5% Metal Oxide	AA
C132, 138	VCEAPC1VW106M		10μF 35V Electrolytic	AB	R129	VRS - CY1JF563J		56k 0.063W 5% Metal Oxide	AA
C133	VCKYCY1CF473Z		0.047μF 16V Ceramic	AA	R130	VRS - CY1JF183J		18k 0.063W 5% Metal Oxide	AA
C134	VCEAPC1EW336M		33μF 25V Electrolytic	AB	R131, 150, 167	VRS - CY1JF105J		1M ohm 0.063W 5% Metal Oxide	AA
C136, 137	VCEAPC1HW105M		1.0μF 50V Electrolytic	AB	R135	VRS - CY1JF392J		3.9k 0.063W 5% Metal Oxide	AA
C143, 144, 146, 168	VCKYCY1CF104Z		0.1μF 16V Ceramic	AA	R138	VRS - TV1JD150J		15 0.063W 5% Metal Oxide	AA
C147, 151	VCSATA1EJ105M		1.0μF 25V Tantalum, (N.P)	AC	R139, 140	VRS - TV1JD100J		10 0.063W 5% Metal Oxide	AA
C156, 160, 162	VCSAPD1CJ105M		1.0μF 16V Tantalum, (N.P)	AC	R141, 142	VRS - CY1JF150J		15 0.063W 5% Metal Oxide	AA
C157, 163, 165, 185	VCKYCY1HF103Z		0.01μF 50V Ceramic	AA	R143	VRS - CY1JF152J		1.5k 0.063W 5% Metal Oxide	AA
C167	VCCCCY1HH100D		10pF 50V Ceramic	AA	R144	VRS - CY1JF471J		470 0.063W 5% Metal Oxide	AA
C169	VCSAPH1CJ335M		3.3μF 16V Tantalum, (N.P)	AD	R146	VRS - CY1JF681J		680 0.063W 5% Metal Oxide	AA
C171	VCCCCY1HH181J		180pF 50V Ceramic	AA	R147, 164, 166	VRS - CY1JF000J		00 0.063W 5% Metal Oxide	AA
C178, 179	VCKYTQ1HB104K		0.1μF 50V Ceramic	AB	R148	VRS - CY1JF273J		27k 0.063W 5% Metal Oxide	AA
RESISTORS					R149	VRS - CY1JF683J		68k 0.063W 5% Metal Oxide	AA
R101, 105, 106, 134	VRS - CY1JF101J		100 0.063W 5% Metal Oxide	AA	R156	VRS - CY1JF104J		100k 0.063W 5% Metal Oxide	AA
R102, 103, 104, 145	VRS - CY1JF102J		1.0k 0.063W 5% Metal Oxide	AA	R158	VRS - CY1JF331J		330 0.063W 5% Metal Oxide	AA
R107	VRS - CY1JF100J		10 0.063W 5% Metal Oxide	AA	R159	VRS - CY1JF391J		390 0.063W 5% Metal Oxide	AA
R111, 112	VRS - CY1JF680J		68 0.063W 5% Metal Oxide	AA	R163	VRS - CY1JF220J		22 0.063W 5% Metal Oxide	AA
R114	VRS - CY1JF303F		30k 0.063W 1% Metal Oxide	AA	CABINET PARTS				
R116, 162	VRS - CY1JF222J		2.2k 0.063W 5% Metal Oxide	AA	TP101, 102, 103	QLUGP0110TAFW		Lug	AA
R117	VRS - CY1JF153J		15k 0.063W 5% Metal Oxide	AA	DUNTK3519HE00 VCR Main Circuit Board Ass'y				
R118	VRS - CY1JF221J		220 0.063W 5% Metal Oxide	AA	INTEGRATED CIRCUITS				
					IC201	VH1NJU4053M-1		NKU4053BM	AF
					IC202	VH1MM1043XF-1		MM1043XF	AQ
					IC203	VH1AN3450NF-1		AN3450NFAP	AV
					IC301	VH1XRA7252/-1		XRA7252S	AF

Ref. No.	Part No.	★	Description	Code	Ref. No.	Part No.	★	Description	Code
IC401	VH i MSM6984MSK		MSM6984MSK	AP	Q821	VSUN2213 /// - 1		UN2213	AA
IC602	VH i BA7757BK - 1		BA7757BK	AL	Q301,	VS2SA812 - M / 1 E		2SA812	AC
IC603,	VH i XR10358F - 1		XRA10358F	AC	302				
703,					Q306,	VS2SB710RS / - 1		2SB710	AB
902					807,				
IC701	VH i XRU2774 / - 1		XRU2774AS	AR	819				
IC704	VH i BA6229U3 - 1		BA6229-U3	AG	Q310,	VS FMG2 /// - 1		FMG2	AC
IC801	RH - i X0951GEZZ		M37120M6-111FP	BA	609				
IC802	VH i M62007FP - 1		M62007FP	AG	Q401,	VS2SC2059KN1E		2SC2059K	AC
IC803	RH - i X0966GEZZ		NJU7201U55	AE	402				
IC804	VH i TC7S08F / - 1		TC7S08FTE85L	AC	Q601	VS2SD999LK / - 1		2SD999	AC
IC805	VH i TC4S81F / - 1		TC4S81FTE85L	AC	Q606	VS FMW3 /// - 1		FMW3	AB
IC901	VH i TL1451AC - 1		TL1451ACN3	AN	Q607	VSUN5113 /// - 1		UN5113-TX	AA
IC904	VH i NJM2403M - 1		NJM2403M	AX	Q610	VSXN4381 /// - 1		XN4381	AC
TRANSISTORS					Q701	VSUN2112 /// - 1		UN2112	AA
Q201,	VS2SC2412KQ - 1		2SC2412K	AA	Q702,	VSUN2212 /// - 1		UN2212	AA
204,					704				
213,					Q705,	VSUN2211 /// - 1		UN2211	AA
217,					707,				
403,					714				
404,					Q712	VSDTA114EK / - 1		DTA114EK	AB
405,					Q713	VSDTC114EK / - 1		DTC114EK	AB
407,					Q809	VS i MZ1 /// - 1		IMZ1	AB
502,					Q820	VSUN2111 /// - 1		UN2111	AA
801,					Q832	VS FMG1 /// - 1		FMG1	AB
802,					Q920	VS2SB956Q / - 1		2SB956Q	AC
803,					Q921,	VS FMY1 /// - 1		FMY1	AB
816,					941				
817,					Q930	VS i MD2 /// - 1		IMD2	AC
818,					Q931	VS FMC5 /// - 1		FMC5	AB
972,					Q933	VS2SA1298Y / - 1		2SA1298	AB
974					Q940	VS2SA1213Y / - 1		2SA1213	AD
Q202,	VS2SA1037KQ - 1		2SA1037K	AA	Q960	VS2SD1757KS - 1		2SD1757K	AC
215,					Q970,	VSSAH02 /// - 1		SAH02	AE
501,					971				
706,					Q973	VS2SB1184F5 - 1		2SB1184	AD
825					DIODES AND LED'S				
Q203,	VSXN4213 /// - 1		XN4213	AB	D201,	VH DMA153 /// - 1		MA153	AB
710,					215,				
826					821				
Q207,	VSUN2113 /// - 1		UN2113	AA	D202,	VHD1S2835 /// 1 E		1S2835	AC
709,					209				
815,					D206	VHD1S2837 /// 1 E		1S2837	AC
822					D207,	VH DMA151K / - 1		MA151K	AB
Q208,	VSUN2213 /// - 1		UN2213	AA	208,				
209,					210,				
210,					211,				
211,					213,				
214,					214,				
216,					301,				
303,					701,				
309,					704,				
312,					706,				
708,					709,				
804,					801,				
808,					807,				
810,					808,				
811,					809,				
812,					818,				
813,					972				
814,					D703	VH DMA125 /// - 1		MA125	AC
					D803,	RH - PX0144GEZZ		Photodiode	AB
					805,				
					806				
					D804	RH - PX0138GEZZ		Photodiode	AB

★ MARK: SPARE PARTS DELIVERY SECTION

Ref. No.	Part No.	★	Description	Code	Ref. No.	Part No.	★	Description	Code
D810, 811, 812	VHDDAP202K / - 1		DAP202K	AB	L602	RCILP0065GEZZ		Coil	AC
D815, 820	VHDRB421D / - 1		Diode	AA	L604	VP - 1M101K7R7N		Peaking 100μH 10%	AC
D816	VHDRB471E / - 1		RB471E	AC	L802, 803	VP - 0K220K1R0N		Peaking 22μH 10%	AB
D819, 917, 921, 923	VHDDAN202K / - 1		DAN202K	AB	L910	RCILP0136TAZZ		Coil	AD
D920, 925	VHDSFPB64 / / 2E		SFPB-64	AC	L930	RCILP0120TAZZ		Coil	AE
D940	VHDSFPB54 / / 2E		SFPB-54	AC	L931	RCILP0049GEZZ		Coil	AD
					L940	RCILP0137TAZZ		Coil	AD
					L970	RCILP0051GEZZ		Coil	AD
					L971, 972	RCILP0059GEZZ		Coil	AE
					T601	RTRNH0061GEZZ		OSC. Transformer	AD
					T901	RTRNZ0052TAZZ		Transformer	AF
PACKAGED CIRCUITS					CONTROLS				
X501 X801	RCRSB0032CEZZ RCRSB0090GEZZ		Crystal Crystal	AH AE	R223, 246	RVR - M7826TAZZ		Variable Resistor	AC
					R233, 239, 878	RVR - M7824TAZZ		Variable Resistor	AC
					R242, 244	RVR - M7822TAZZ		Variable Resistor	AC
COIL AND TRANSFORMERS					R312	RVR - M7820TAZZ		Variable Resistor	AC
CF801	RFILC0094GEZZ		Filter	AC	R313, 929	RVR - M7818TAZZ		Variable Resistor	AC
DL501	RCILZ0309GEZZ		Coil	AM	R413	RVR - M7817TAZZ		Variable Resistor	AB
FL501	RCILV0075GEZZ		Coil	AG	R520	RVR - M7821TAZZ		Variable Resistor	AC
FL502	RCILV0076GEZZ		Coil	AE	R602	RVR - M7832TAZZ		Variable Resistor	AC
FL601	RCILIO310TAZZ		IF Coil	AD	R633	RVR - M7827TAZZ		Variable Resistor	AC
FL602	RCILIO080GEZZ		IF Coil	AE	R728	RVR - M7830TAZZ		Variable Resistor	AC
L201, 202, 203, 206, 303, 304, 307, 401, 502, 601, 923, 924	VP - 0K101K3R4N		Peaking 100μH 10%	AB	R946	RVR - M7816TAZZ		Variable Resistor	AC
L204, 209, 412	VP - 0K221K6R2N		Peaking 220μH 10%	AB	CAPACITORS				
L205, 411	VP - 0K331K100N		Peaking 330μH 10%	AB	C201, 202, 204, 408, 506, 605, 615, 619, 620, 702, 703, 704, 741, 820	VCEAEM1CW106M		10μF 16V Electrolytic	AB
L207, 306	VP - 0K820K2R8N		Peaking 82μH 10%	AB	C203, 206, 207, 210, 216, 219, 224, 225, 230, 232, 234, 237, 311,	VCKYCY1HF103Z		0.01μF 50V Ceramic	AA
L208	VP - 0K680K2R5N		Peaking 68μH 10%	AB					
L210	VP - 1M470J5R4N		Peaking 47μH 5%	AC					
L301	VP - 0K5R6KR43N		Peaking 5.6μH 10%	AB					
L302	VP - 0K180KR85N		Peaking 18μH 10%	AB					
L305	VP - 0K151K4R6N		Peaking 150μH 10%	AB					
L308	VP - 1M180J2R5N		Peaking 18μH 5%	AC					
L309	VP - 0K561K160N		Peaking 560μH 10%	AB					
L310	VP - 1M221K170N		Peaking 220μH 10%	AC					
L402	VP - 1M390K4R9N		Peaking 39μH 10%	AC					
L403, 932	VP - 0K150KR77N		Peaking 15μH 10%	AB					
L404	VP - 0K271K9R5N		Peaking 270μH 10%	AB					
L405	VP - 0K100KR62N		Peaking 10μH 10%	AB					
L406, 407	VP - 0K470K1R7N		Peaking 47μH 10%	AB					
L501	VP - 0K471K130N		Peaking 470μH 10%	AB					

Ref. No.	Part No.	★	Description	Code	Ref. No.	Part No.	★	Description	Code
C312, 314, 320, 325, 332, 401, 402, 411, 413, 414, 416, 420, 501, 504, 507, 508, 509, 510, 511, 513, 514, 518, 529, 705, 706, 710, 724, 732, 739, 809, 815, 824, 831, 832, 975	VCKYCY1HF103Z		0.01μF 50V Ceramic	AA	C302, 305, 309, 310, 330, 423, 533, 709, 712, 717, 728, 734, 742, 744, 747, 808, 827, 829, 830, 941	VCKYCY1CF104Z		0.1μF 16V Ceramic	AA
C205, 208, 608, 609, 625, 626, 707	VCEAEM1HW105M		1.0μF 50V Electrolytic	AB	C229, 526 C231 C233, 925, 955	VCEAEM0JW227M		220μF 6.3V Electrolytic	AB
C209 C212 C217, 412, 611, 621, 627, 701, 719, 751	RC-EZ0197TAZZ VCEAGG0JW477M VCEAEM0JW476M		Capacitor 470μF 6.3V Electrolytic 47μF 6.3V Electrolytic	AB AB AB	C235, 236, 505 C238, 821 C239, 303, 304, 335	VCCSTV1HL102J VCKYCY1EF223Z		1000pF 50V Ceramic 0.022μF 25V Ceramic	AA AA
C218, 222, 516, 521, 622, 733	VCEAEM1VW475M		4.7μF 35V Electrolytic	AB	C240, 405, 601, 610 C241, 983 C242, 407, 826	VCCCCY1HH220J VCKYTV1EF104Z VCCCCY1HH330J		220pF 50V Ceramic 0.1μF 25V Ceramic 33pF 50V Ceramic	AA AB AA
C220, 624, 731	VCEAEM0JW336M		33μF 6.3V Electrolytic	AA	C301, 306, 307, 316 C308, 331, 606, 708, 740, 924	VCEAKM1HW105M VCCCCY1HH471J		1.0μF 50V Electrolytic 470pF 50V Ceramic	AB AA
C221 C223, 319 C226, 422 C227 C228,	VCKYCY1EB822K VCCCCY1HH820J VCCCCY1HH680J VCCCCY1HH180J VCKYCY1CF104Z		8200pF 25V Ceramic 82pF 50V Ceramic 68pF 50V Ceramic 18pF 50V Ceramic 0.1μF 16V Ceramic	AA AA AA AA AA	C313 C315 C317 C318, 729 C321, 326 C324, 410, 417, 525, 711, 801, 819,	VCEAKM1CW476M VCEAKM0JW476M VCCCCY1HH560J VCCCCY1HH391J VCEAKM1CW106M VCKYTQ1CF105Z		47μF 16V Electrolytic 47μF 6.3V Electrolytic 56pF 50V Ceramic 390pF 50V Ceramic 10μF 16V Electrolytic 1.0μF 16V Ceramic	AB AB AA AA AB AC

Ref. No.	Part No.	★	Description	Code	Ref. No.	Part No.	★	Description	Code
R331, 409, 416, 417, 420, 421, 428, 511, 515, 528, 536, 706, 734, 739, 814, 816, 817, 818, 819, 857, 863, 884, 963, 973, 982	VRS - CY1JF102J		1.0k 0.063W 5% Metal Oxide	AA	R713, 722, 723, 725, 729, 730, 731, 742, 769, 770, 810, 820, 821, 822, 831, 839, 848, 889, 892, 894, 895, 921, 927, 941, 948, 978, 985	VRS - CY1JF103J		10k 0.063W 5% Metal Oxide	AA
R211, 231, 260, 311, 411, 426, 427, 521, 760, 767, 768, 773, 775, 845, 852	VRS - CY1JF222J		2.2k 0.063W 5% Metal Oxide	AA	R224, 234, 265, 612, 882, 883, 944	VRS - CY1JF183J		18k 0.063W 5% Metal Oxide	AA
R215, 243, 314, 315, 337, 526, 641, 642, 727, 745, 778, 809, 811, 888	VRS - CY1JF472J		4.7k 0.063W 5% Metal Oxide	AA	R225, R226, 719, 721, 899	VRS - CY1JF225J		2.2M ohm 0.063W 5% Metal Oxide	AA
R222, 228, 229, 251, 252, 253, 254, 256, 262, 335, 619, 634, 645, 710,	VRS - CY1JF103J		10k 0.063W 5% Metal Oxide	AA	R227, 503, 537, 614, 924	VRS - CY1JF182J		1.8k 0.063W 5% Metal Oxide	AA
					R230, 271, 402, 425, 629, 757, 758, 805, 902	VRS - CY1JF682J		6.8k 0.063W 5% Metal Oxide	AA
					R232, 240, 639	VRS - CY1JF123J		12k 0.063W 5% Metal Oxide	AA
					R235	VRS - CY1JF301J		300 0.063W 5% Metal Oxide	AA
					R236	VRS - CY1JF112J		1.1k 0.063W 5% Metal Oxide	AA
					R237, 305, 321, 322, 627, 736, 829,	VRS - CY1JF561J		560 0.063W 5% Metal Oxide	AA

★ MARK: SPARE PARTS DELIVERY SECTION

Ref. No.	Part No.	★	Description	Code	Ref. No.	Part No.	★	Description	Code
R970, 981	VRS - CY1JF561J		560 0.063W 5% Metal Oxide	AA	R703, 732, 733, 843, 850, 961	VRS - CY1JF122J		1.2k 0.063W 5% Metal Oxide	AA
R238, 274, 646, 716, 928, 945, 974	VRS - CY1JF272J		2.7k 0.063W 5% Metal Oxide	AA	R316, 320, 327, 501, 604, 726, 834, 950	VRS - CY1JF223J		22k 0.063W 5% Metal Oxide	AA
R241, 419, 525, 530, 620, 709, 756, 771, 772	VRS - CY1JF153J		15k 0.063W 5% Metal Oxide	AA	R323	VRS - TQ2BD121J		120 1/8W 5% Metal Oxide	AA
R257, 401, 624, 625, 644, 847	VRS - CY1JF562J		5.6k 0.063W 5% Metal Oxide	AA	R324, 840, 841, 842, 879	VRS - CY1JF000J		00 0.063W 5% Metal Oxide	AA
R258, 259, 711, 718	VRS - CY1JF154J		150k 0.063W 5% Metal Oxide	AA	R325, 516, 532, 541, 844, 851, 881, 947, 960	VRS - CY1JF152J		1.5k 0.063W 5% Metal Oxide	AA
R263, 264, 631, 837	VRS - CY1JF105J		1M ohm 0.063W 5% Metal Oxide	AA	R334, 423, 519, 538, 812, 846, 925	VRS - CY1JF332J		3.3k 0.063W 5% Metal Oxide	AA
R267	VRS - CY1JF331J		330 0.063W 5% Metal Oxide	AA	R336, 622, 648, 743, 854, 855, 856, 865, 871, 873	VRS - CY1JF473J		47k 0.063W 5% Metal Oxide	AA
R272	VRS - CY1JF392J		3.9k 0.063W 5% Metal Oxide	AA	R403, 405, 407, 523, 610, 926, 949	VRS - CY1JF821J		820 0.063W 5% Metal Oxide	AA
R273, 414, 621, 626, 643, 777, 833, 853	VRS - CY1JF221J		220 0.063W 5% Metal Oxide	AA	R406	VRS - CY1JF181J		180 0.063W 5% Metal Oxide	AA
R275	VRS - CY1JF133J		13k 0.063W 5% Metal Oxide	AA	R412	VRS - CY1JF330J		33 0.063W 5% Metal Oxide	AA
R276, 307	VRS - CY1JF151J		150 0.063W 5% Metal Oxide	AA	R418, 502, 609, 623, 628, 630, 830, 849, 922, 923,	VRS - CY1JF333J		33k 0.063W 5% Metal Oxide	AA
R301, 302, 601	VRS - CY1JF100J		10 0.063W 5% Metal Oxide	AA					
R303, 304, 408, 410, 517, 636, 896	VRS - CY1JF681J		680 0.063W 5% Metal Oxide	AA					
R306, 603	VRS - CY1JF470J		47 0.063W 5% Metal Oxide	AA					
R308	VRS - CY1JF121J		120 0.063W 5% Metal Oxide	AA					
R309, 404, 512, 518, 527, 615,	VRS - CY1JF122J		1.2k 0.063W 5% Metal Oxide	AA					

Ref. No.	Part No.	★	Description	Code	Ref. No.	Part No.	★	Description	Code
R942, 943	VRS - CY1JF333J		33k 0.063W 5% Metal Oxide	AA	R803	VRS - CY1JF683J		68k 0.063W 5% Metal Oxide	AA
R504, 529, 542, 544, 650, 651, 652, 653, 708, 712, 717, 866, 867, 868, 872, 891, 893, 962	VRS - CY1JF104J		100k 0.063W 5% Metal Oxide	AA	R804, 870, 875, 880	VRS - CY1JF823J		82k 0.063W 5% Metal Oxide	AA
R513	VRS - CY1JF271J		270 0.063W 5% Metal Oxide	AA	R828	VRS - TQ2BD122J		1.2k 1/8W 5% Metal Oxide	AA
R522, 877	VRS - CY1JF513J		51k 0.063W 5% Metal Oxide	AA	R838	VRS - CY1JF106J		10M ohm 0.063W 5% Metal Oxide	AA
R524	VRS - TQ2BD181J		180 1/8W 5% Metal Oxide	AA	R869, 874	VRS - CY1JF124J		120k 0.063W 5% Metal Oxide	AA
R539, 540, 705, 738	VRS - CY1JF334J		330k 0.063W 5% Metal Oxide	AA	R890	VRS - TW2ED680J		68 1/4W 5% Metal Oxide	AA
R605, 606	VRS - TQ2BD100J		10 1/8W 5% Metal Oxide	AA	R958	VRS - TV1JD2R2J		2.2 0.063W 5% Metal Oxide	AA
R611, 714	VRS - CY1JF563J		56k 0.063W 5% Metal Oxide	AA	R971	VRS - CY1JF332F		3.3k 0.063W 1% Metal Oxide	AA
R613, 704, 720, 815, 858, 859, 860, 861, 862	VRS - CY1JF822J		8.2k 0.063W 5% Metal Oxide	AA	R977, 983	VRS - TV1JD561J		560 0.063W 5% Metal Oxide	AA
R635	VRS - CY1JF274J		270k 0.063W 5% Metal Oxide	AA	R987, 988	VRS - CY1JF333F		33k 0.063W 1% Metal Oxide	AA
R701, 702, 972	VRS - CY1JF223F		22k 0.063W 1% Metal Oxide	AA	MISCELLANEOUS PARTS				
R707	VRS - CY1JF244J		240k 0.063W 5% Metal Oxide	AA	△ F901	QFS - H3225GEZZ		Fuse, 3.15A 125V	AE
R715, 801, 897	VRS - CY1JF394J		390k 0.063W 5% Metal Oxide	AA	J1	QJAKE0039TAZZ		Jack	AL
R735, 951	VRS - CY1JF393J		39k 0.063W 5% Metal Oxide	AA	P3	QPLGN0921REZZ		Plug	AB
R744, 813	VRS - CY1JF560J		56 0.063W 5% Metal Oxide	AA	P8	QPLGN0221REZZ		Plug	AA
R746, 930, 940, 986	VRS - CY1JF474J		470k 0.063W 5% Metal Oxide	AA	P9, 17	QPLGN0421REZZ		Plug	AB
R759	VRD - RA2HDR50J		0.50 1/2W 5% Carbon	AA	P10	QPLGN0820REZZ		Plug	AB
R766	VRS - CY1JF680J		68 0.063W 5% Metal Oxide	AA	P11	QPLGN0229TAZZ		Plug	AB
R776	VRS - CY1JF471J		470 0.063W 5% Metal Oxide	AA	P13, 20	QPLGN0420REZZ		Plug	AA
R802	VRS - CY1JF184J		180k 0.063W 5% Metal Oxide	AA	P14	QPLGN1120REZZ		Plug	AB
					P16	QPLGN0920REZZ		Plug	AB
					P18	QPLGN0721REZZ		Plug	AB
					P50	QPLGN0320REZZ		Plug	AA
					SW801	QSW - S0214GEZZ		Switch	AC
					SW802, 807	QSW - K0049CEZZ		Switch	AE
					SW804	QSW - F0003CEZZ		Switch	AD
					SW805, 806, 811, 813, 814	QSW - K0014CEZZ		Switch	AC
					SW816, 817, 818	QSW - K0030CEZZ		Switch	AB
					S1	QSOCN0895GEZZ		Socket	AC
					S4	QSOCN0695GEZZ		Socket	AB
					S5, 7	QSOCN0795GEZZ		Socket	AB
					S6	QSOCN0595GEZZ		Socket	AB
					S51	QSOCZ0031TAZZ		Socket	AF

★ MARK: SPARE PARTS DELIVERY SECTION

Ref. No.	Part No.	★	Description	Code	Ref. No.	Part No.	★	Description	Code
CABINET PARTS									
E801 TP202, 203, 206, 207, 208, 211, 401, 501, 502, 601, 602, 603, 604, 701, 702, 703, 801, 901, 902, 903	LHLDB1005GEZZ QLUGP0110TAFW		Holder Lug	AG AA					

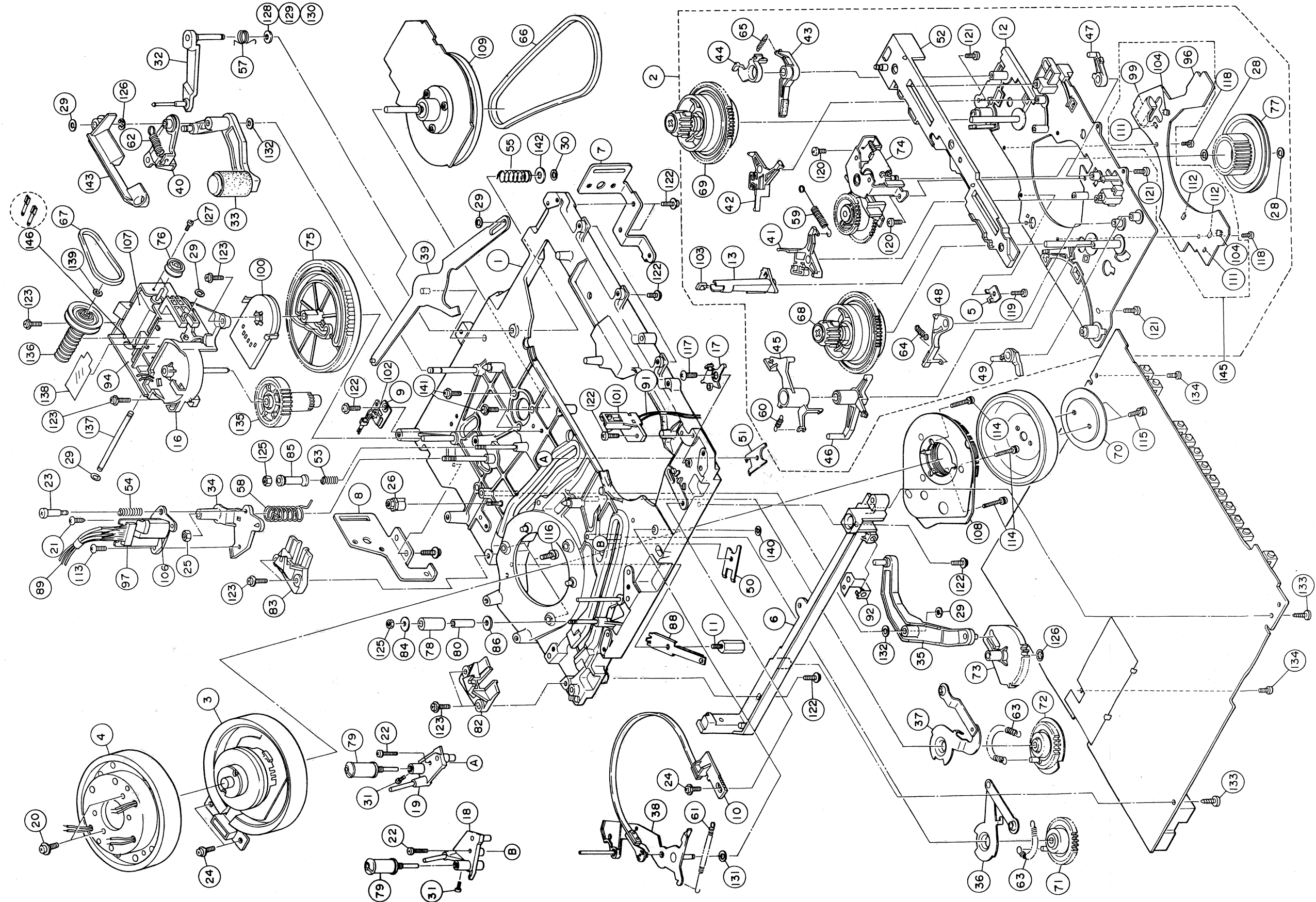
MECHANISM CHASSIS PARTS

★ MARK: SPARE PARTS DELIVERY SECTION

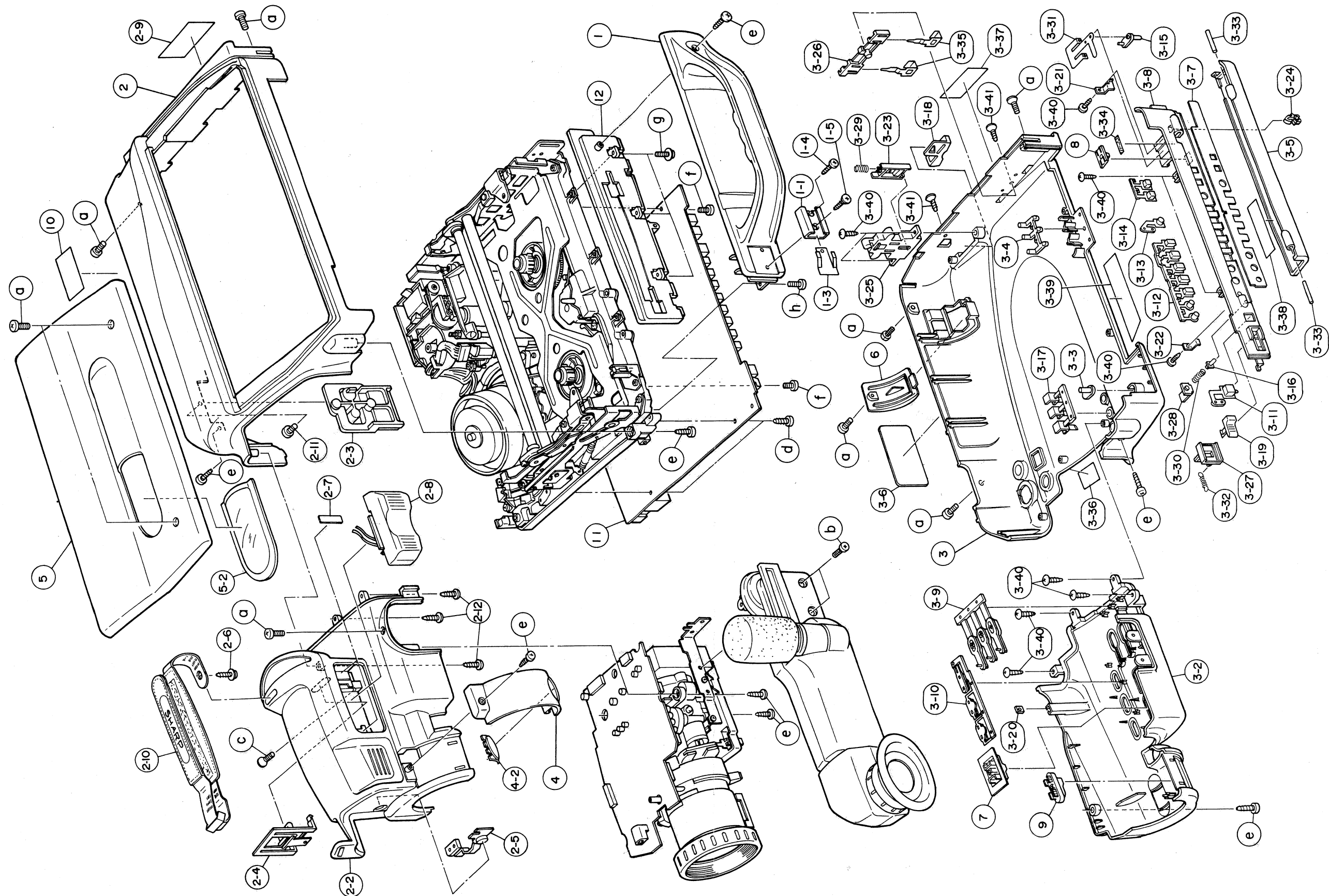
Ref. No.	Part No.	★	Description	Code	Ref. No.	Part No.	★	Description	Code
1	CCHSM0106GE00		Main Chassis Ass'y.	BC	25	LX- NZ3019GEZZ		Nut	AB
2	CCHSS0022GE40		Reel Block Ass'y.	BC	26	LX- NZ3046GEFW		Nut (X Position Adjusting)	AB
3	DDRML0014HE02		Lower Drum Ass'y.	BF	28	LX- WZ1040GE00		Washer	AA
4	DDRMU0012HE02		Upper Drum Ass'y.	BK	29	LX- WZ1041GE00		Washer	AA
5	LANGA0055GEFW		Capstan Retaining Bracket	AA	30	LX- WZ1046GEZZ		Washer	AB
6	LHLDZ1129TA00		Chassis Retaining Bracket	AC	31	LX- XZ3030GEFD		Screw	AC
7	LANGT0417TAF		Belt Bracket-A	AE	32	MLEVC0023GEZZ		Reverse Guide	AG
8	LANGT0418TAF		Belt Bracket-B	AE	33	MLEVC0027GEZZ		Pinch Roller Lever Ass'y.	AR
9	LANGT9144GEFW		Dew Sensor Bracket	AB	34	MLEVC0028GEFW		A/C Head Arm	AG
10	LBNDK1002GEZZ		Tension Band Ass'y.	AD	35	MLEVC0029GEZZ		Relay Gear Drive Lever	AK
11	LB6SZ3047GEZZ		Ground Brush Bos	AC	36	MLEVF0303GEZZ		Supply Loading Arm Ass'y.	AC
12	LCHSS0022GEZZ		Reel Block Chassis	AP	37	MLEVF0304GEZZ		Take-Up Loading Arm Ass'y.	AC
13	LHLDP1092GEZZ		Cassette LED Holder	AE	38	MLEVF0308GEZZ		Tension Arm Ass'y.	AF
16	LHLDZ1649GENZ		Loading Block Holder Ass'y.	AK	39	MLEVF0290GEZZ		Relay Shifter Lever	AE
17	LHLDZ1664GEZZ		Tension Spring Hook Plate	AA	40	MLEVF0314GEZZ		Pinch Reciprocating Lever	AF
18	LP6LM0036GEZZ		Supply Pole Base Ass'y.	AG	41	MLEVP0128GEZZ		Main Supply Brake Lever	AE
19	LP6LM0037GEZZ		Take-Up Pole Base Ass'y.	AG	42	MLEVP0129GEZZ		Main Take-Up Brake Lever	AE
20	LX- BZ3039GEFN		Screw	AA	43	MLEVP0181GEZZ		VS. Brake Lever	AA
21	LX- BZ3096GEFD		Screw (Tilt Adjusting)	AA	44	MLEVP0131GEZZ		VS. Reciprocating Lever	AC
22	LX- BZ3099GEZZ		Screw	AB	45	MLEVP0132GEZZ		Brake Tension Lever	AC
23	LX- BZ3109GEZZ		Screw (A/C Head)	AA	46	MLEVP0133GEZZ		Tension Release Lever	AC
24	LX- HZ3043GEZZ		Screw	AA	47	MLEVP0135GEZZ		Intermediate Lever	AC

Ref. No.	Part No.	★	Description	Code	Ref. No.	Part No.	★	Description	Code
48	MLEVP0146GEZZ		FF. Auxiliary Brake	AE	94	CPRBF3537GE00		Loading Block PWB Ass'y	AG
49	MLEVP0160GEZZ		Tension Adjusting Lever	AB				Reel Unit PWB	AB
50	MSLiF0048GEFW		Supply Pole Base Slider	AB	96	QPWBF3196GEZZ		A/C Head PWB	AB
51	MSLiF0049GEFW		Take-Up Pole Base Slider	AB	97	QPWBS3536GEZZ		Socket 7 Pin	AC
52	MSLiF0051GEZZ		Brake Shifter	AH	99	QSöCN0734REZZ		Cam Switch	AF
53	MSPRC0142GEFJ		Retaining Guide Spring	AA	100	QSW- R0023GEZZ		Erase Protection Switch	AE
54	MSPRC0144GEFJ		Azimuth Spring	AA	101	QSW- Z0034GEZZ		Dew Sensor	AE
55	MSPRC0172GEFJ		Reverse Guide Spring	AA	102	RDTCH0029GEZZ		Cassette LED	AD
57	MSPRD0086GEFJ		Reverse Guide Spring	AA	103	RH- PX0180GEZZ		Reel Sensor	AE
58	MSPRD0087GEFJ		A/C Head Arm Spring	AA	104	RH- PX0181GEZZ		A/C Head Ass'y.	AU
59	MSPRT0272GEFJ		Main Brake Spring	AC	106	RHEDU0076GEZZ		Loading Motor	AN
60	MSPRT0273GEFJ		FF. Spring	AB	107	RMöTM1057GEZZ		DD Drum Motor	AW
61	MSPRT0275GEFJ		Tension Spring	AA	108	RMöTP1105GEZZ		DD Capstan Motor	BC
62	MSPRT0291GEFJ		Pinch Reciprocating Spring	AA	109	RMöTV2002GEZZ		0.001µF, 50V, Ceramic	AA
63	MSPRT0308GEFJ		Loading Reciprocating Spring	AA	111	VCKYTV1HB102K		220 ohm, 1/4W, Carbon	AA
64	MSPRT0309GEFJ		FF. Auxiliary Brake Spring	AA	112	VRS- TW2ED221J		Screw	AA
					113	XBPSD26P06000		Screw	AA
65	MSPRT0310GEFJ		VS Brake Spring	AA	114	XBPSD26P12J00		Screw	AA
66	NBLTK0059GE00		Reel Belt	AB	115	XBPSD30P05J00		Screw	AA
67	NBLTK0058GE00		Loading Belt	AA	116	XBPSD30P08J00		Screw	AA
68	NDAiV1050GEZZ		Supply Reel Disk Ass'y.	AK	117	XBTSD26P04000		Screw	AA
69	NDAiV1051GEZZ		Take-Up Reel Disk Ass'y.	AK	118	XHPSD20P03000		Screw	AA
70	NFLYV0067GEZZ		Damper	AF	119	XHPSD20P06000		Screw	AA
71	NGERH1119GEZZ		Supply Loading Gear	AA	120	XHPSD26P03000		Screw	AA
72	NGERH1120GEZZ		Take-Up Loading Gear	AA	121	XHPSD26P06000		Screw	AA
73	NGERH1121GEZZ		Loading Reciprocating Gear	AA	122	XHPSD26P06WS0		Screw	AA
					123	XHPSD26P08WS0		Screw	AA
74	NGERH1128GEZZ		Idler Gear Ass'y.	AN	125	XNFS20- 16000		Nut	AA
75	NGERH1130GEZZ		Master Cam	AD	126	XRESJ25- 04000		E Ring	AA
76	NPLYV0141GEZZ		Loading Motor Pulley	AA	127	XSPSD20P04000		Screw	AA
77	NPLYV0134GEZZ		Reel Pulley	AC	128	XWHJZ25- 01050		Washer	AA
78	NRöLP0084GEZZ		Supply Impedance Roller	AC	129	XWHJZ25- 02050		Washer	AA
79	NRöLP0062GEZZ		Guide Roller Ass'y.	AE	130	XWHJZ25- 04050		Washer	AA
80	NSFTL0563GEFW		Supply Impedance Roller Inner	AC	131	XWHJZ25- 05050		Washer	AA
					132	XWHJZ31- 02060		Washer	AA
82	PGiDC0041GEFW		Supply V-Block	AD	133	XEBSF26P06000		Screw	AA
83	PGiDC0042GEFW		Take-Up V-Block	AD	134	XBPSD26P04000		Screw	AA
84	PGiDH0031GEFW		Supply Impedance Roller Flange	AA	135	NGERW1039GEZZ		Worm Wheel	AC
					136	NGERW1040GEZZ		Worm Ass'y.	AC
85	PGiDS0023GEFW		Retaining Guide	AE	137	NSFTG0052GEFJ		Worm Shaft	AE
86	PGiDS0027GEZZ		Supply Impedance Roller Flange-L	AA	138	PCöVP9014GEZZ		Cover	AC
					139	XWHJZ31- 05054		Washer	AA
88	QBRSK0022GEZZ		Ground Brush	AC	140	LX- WZ1003GE00		Washer	AA
89	QCNW- 6394GEZZ		Connecting Cord	AD	141	XBPSD26P05WS0		Screw	AA
91	QCNW- 5873GEZZ		Connecting Cord	AC	142	XWHSD26- 08080		Washer	AA
92	QEARP0133TAFW		Ground Plate	AC	143	PGiDM0075GEZZ		Cassette Cover Opener	AB
					145	CPWBF3196GE40		Reel Block PWB Ass'y	AK
					146	QTANS9001GEZZ		Loading Motor Terminal	AA

MECHANISM CHASSIS PARTS



CABINET PARTS



CABINET PARTS

★ MARK: SPARE PARTS DELIVERY SECTION

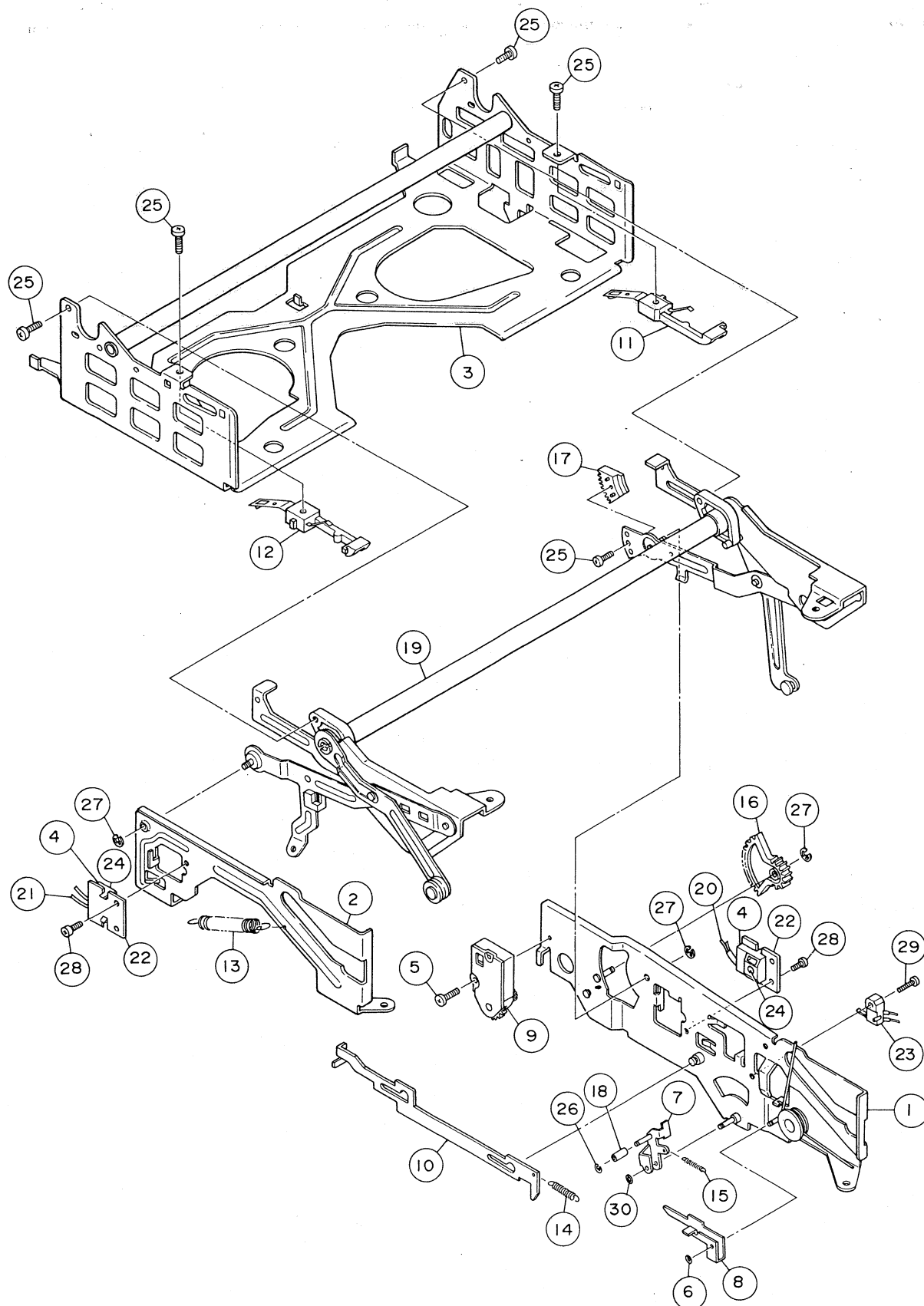
Ref. No.	Part No.	★	Description	Code	Ref. No.	Part No.	★	Description	Code
1	CHNDP0020TA01		Handle Ass'y.	AQ	3-24	LHLD S1010GEZZ		Door Ruch	AA
1-1	GDAi - 3036TA00		Shoe	AF	3-25	LHLDZ1058TA00		Battery Ruch Holder	AB
1-3	MSPRP0072TA00		Shoe Spring	AD	3-26	LHLDZ1059TA00		Battery Terminal Holder	AD
1-4	XEPSF26P08000		Screw	AA	3-27	LHLDZ1126TA00		Knob Holder (Power)	AB
1-5	XJSSF26P08000		Screw	AA	3-28	LHLDZ1128TA00		Button Holder (Door Stop)	AB
2	CCABA6053TAK1		Cabinet (A) Ass'y.	BE					
2-2	GCABD6014TAKA		Cabinet (D)	AR	3-29	MSPRC0037TAFW		Battery Ruch Spring	AA
2-3	GDAi - 1024TA00		Tripod	AG	3-30	MSPRC0048TAFW		Door Stop Button Spring	AA
2-4	JBTN- 0153TASA		Button, REC. S/S	AC	3-31	MSPRP0080TAFW		Door Switch Button Spring	AA
2-5	JBTN- 0154TASA		Button, Self Timer	AB					
2-6	LX- HZ0005TAFD		Screw	AA	3-32	MSPRT0021TAFW		Power Switch Spring	AA
2-7	PSPAHO006TAZZ		Spacer	AA	3-33	NSFTZ0009TAFW		Door Shaft	AB
2-8	QSW- Z0029TAZZ		Switch, Power Zoom	AN	3-34	PSPAHO013TA00		Spacer	AA
2-9	TLABZ0231TAZZ		Note Label	AA	3-35	QCNW- 1060TAZZ		Battery Connector	AF
2-10	UBNDT0044TASA		Grip Belt	AQ	3-36	TCAUS0465TAZZ		Caution Label (Safety Standard)	AA
2-11	XBBSF26P06000		Screw	AA					
2-12	XEASD26P06000		Screw	AA	3-37	TCAUS0466TAZZ		Caution Label (Safety Standard)	AA
3	CCABB6061TAK1		Cabinet (B) Ass'y.	BG					
3-2	GCABC6013TAKA		Cabinet (C)	AU	3-38	TLABZ0169TAZZ		Door Label	AA
3-3	GC6VA1216TAZZ		Power LED Cover	AB	3-39	TLABZ0253TAZZ		Feature Label	AC
3-4	GC6VA1217TAZZ		REC, Audio Dub, Insert LED Cover	AC	3-40	XEASD26P06000		Screw	AA
					3-41	XJSSF26P06000		Screw	AA
3-5	GD6RS1007TASA		Door	AM	4	CC6VA1218TAK1		Lens Cover Ass'y.	AL
3-6	GPADS0007TASA		Shoulder Pad	AL	4-2	GMADi 0012TASA		Indication Window	AE
3-7	Hi NDP0140TASA		Indication Panel (VCR)	AE	5	CFTAC1084TA01		Cassette Cover Ass'y.	AT
3-8	HPNLC6021TAKA		Panel	AQ	5-2	GMADC0019TASA		Cassette Window	AE
3-9	JBTN- 0155TASA		Button, Camera	AB	6	GFTAB1028TASA		Lithium Battery Cover	AD
3-10	JBTN- 0156TASA		Button, Camera	AB	7	JKNBP0065TASA		Knob (Full Auto Lock)	AC
3-11	JBTN- 0157TASA		Button, Eject	AB	8	JKNBP0066TASA		Knob (Edit)	AC
3-12	JBTN- 0158TASA		Button, VCR	AD	9	JKNBP0067TASA		Knob (Zoom)	AC
3-13	JBTN- 0159TASA		Button, REC	AB	10	TLABM1363TAZZ		Model Label	AB
3-14	JBTN- 0160TASA		Button, Audio Dub, Insert	AB	11	DUNTK3519HE00		VCR Main PWB Ass'y.	—
					12	LHLDZ1093TA00		Cabinet Holder	AC
3-15	JBTN- 0161TA00		Button, Door Switch	AB	a	XBBSF26P06000		Screw	AA
3-16	JBTN- 0162TA00		Button, Door Stop	AB	b	XBBSF26P08000		Screw	AA
3-17	JBTN- 0163TASA		Button, Counter	AB	c	XBBSF26P06000		Screw	AA
3-18	JKNBP0063TASA		Knob, Battery Eject	AB	d	XEBSF26P06000		Screw	AA
3-19	JKNBP0064TASA		Knob, Power	AC	e	XEBSF26P08000		Screw	AA
3-20	LANGKO222TAFW		Retaining Metal	AA	f	XBPSD26P04000		Screw	AA
3-21	LANGTO415TAFW		Shaft Bracket (A)	AE	g	XHPSF26P08WS0		Screw	AA
3-22	LANGTO416TAFW		Shaft Bracket (B)	AE	h	LX- HZ3043GEZZ		Screw	AA
3-23	LHLDB1006TA00		Battery Ruch	AD					

CASSETTE HOUSING CONTROL PARTS

★ MARK: SPARE PARTS DELIVERY SECTION

Ref. No.	Part No.	★	Description	Code	Ref. No.	Part No.	★	Description	Code
1	CHL DX3048GE40		Cassette Housing	BD	16	NGERH1131GEZZ		Damper Relay Gear	AA
	LANGT9146GEZZ		Control Ass'y.		17	NGERH1132GEZZ		Damper Segment Gear	AA
2	LANGT9121GEFW		Retaining Bracket Ass'y.	AD	18	NR6LP0069GEZZ		Lock Roller	AB
3	LHLDX3048GEZZ		(R)		19	CSFTD0021GE40		Cross Link Ass'y.	AN
4	LHLDZ1738GEZZ		Retaining Bracket (L)	AE	20	QCNW-6476GEZZ		Connection Cord (Start	AC
5	LX-BZ3110GEFD		Housing Ass'y.	AT				Sensor)	
6	LX-WZ1029GE00		Sensor Holder	AB	21	QCNW-6516GEZZ		Connection Cord (End	AC
7	MLEVF0346GEZZ		Screw	AA				Sensor)	
8	MLEVF0316GEFW		Washer	AA	22	QPWBF3198GEZZ		Start/End Sensor PWB	AB
9	MLiFV0009GEZZ		Lock Lever	AD	23	QSW-M0027GEZZ		Cassette Down Switch	AC
10	MSLiF0054GEFW		Lock Retaining Lever	AC	24	RH-PX0153GEZZ		Start/End Sensor	AD
11	MSPRP0121GEZZ		Damper Ass'y.	AK	25	XJBSD20P05000		Screw	AA
12	MSPRP0122GEZZ		Eject Shifter	AC	26	XRESJ12-03000		E-Ring	AA
13	MSPRTO293GEFJ		Cassette Guide (R)	AC	27	XRESJ20-04000		E-Ring	AA
14	MSPRTO294GEFJ		Cassette Guide (L)	AC	28	XSPSD20P03000		Screw	AA
15	MSPRTO295GEFJ		Main Spring (L)	AA	29	XSPSD20P06000		Screw	AA
			Spring	AA	30	LX-WZ1030GE00		Washer	AA
			Lock Lever Spring	AA					

CASSETTE HOUSING CONTROL PARTS

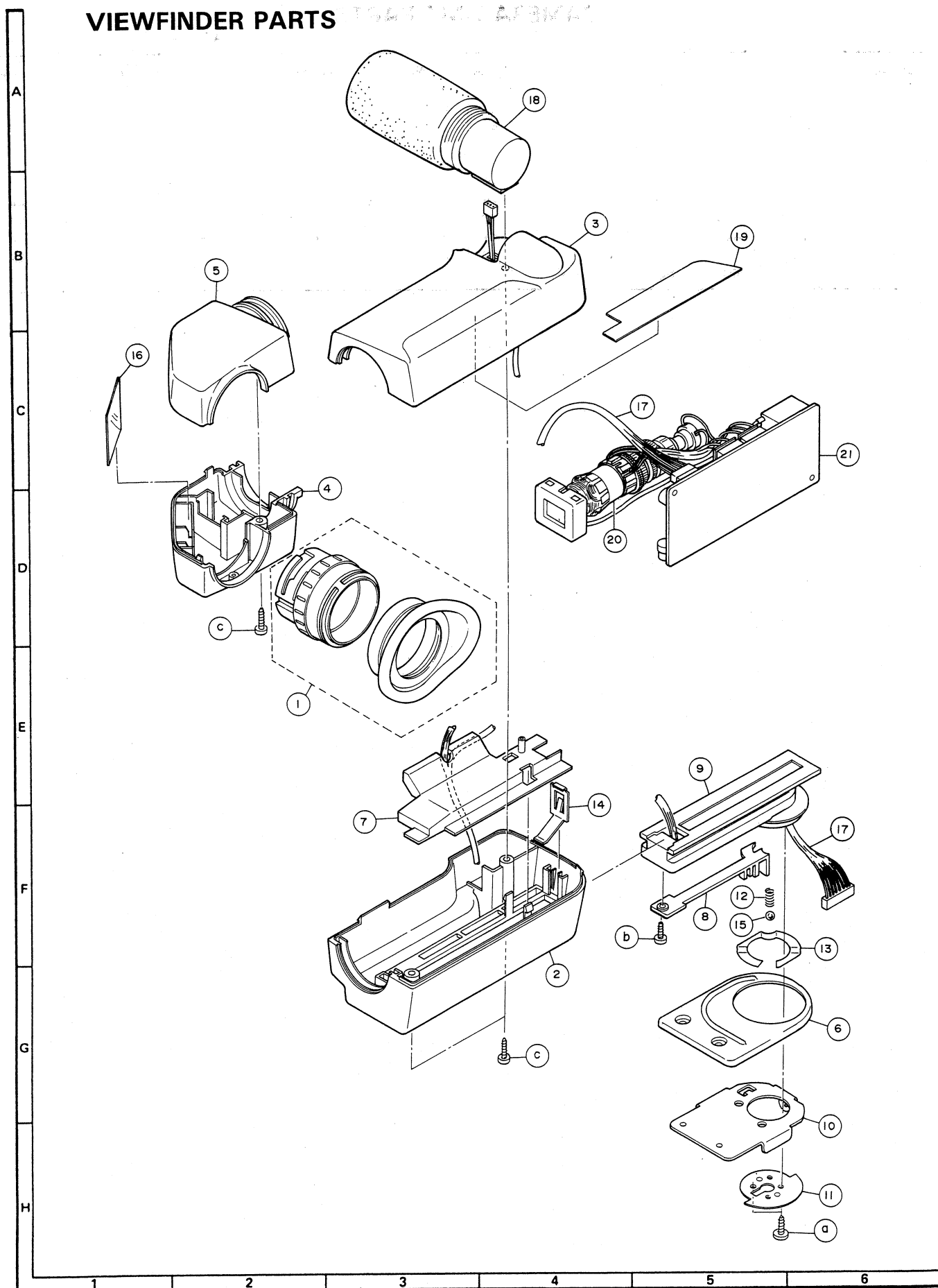


VIEWFINDER PARTS

★ MARK: SPARE PARTS DELIVERY SECTION

Ref. No.	Part No.	★	Description	Code	Ref. No.	Part No.	★	Description	Code
1	CLNS- 0087TA03		Viewfinder Lens Unit	AP	14	MSPRP0082TAFW		Stopper Spring	AA
2	GCABA6054TAKA		Cabinet (A)	AG	15	NBALS0005TAZZ		Ball	AA
3	GCABB6053TAKA		Cabinet (B)	AE	16	PMi R- 0008TAZZ		Mirror	AE
4	GCABC6014TAKA		Cabinet (C)	AE	17	QCNW- 1065TAZZ		Connecting Cord	AK
5	GCABD6015TAKA		Cabinet (D)	AE	18	RMi CC0041TAZZ		Microphone	AU
6	GC6VA1219TASA		Cover	AC	19	TCAUS0478TAZZ		Caution Label	AA
7	GC6VH1105TA00		Wire Cover	AC				(Service man)	
8	GC6VH1106TA00		Arm Wire Cover	AC	Δ20	VB01JYZ60011Y		CRT Ass'y.	BL
9	GDAi - 1030TA00		Arm	AE				(CRT, DY, Socket)	
10	LANGK0270TAF		Arm Base Bracket	AB	21	DUNTK2230PM00		Viewfinder PWB	—
11	LANGT0420TAF		Arm Plate	AB	a	XEBSF26P08000		Screw	AA
12	MSPRC0049TAFJ		Ball Spring	AA	b	XEPSB20P06000		Screw	AA
13	MSPRP0081TAFW		Arm Spring	AA	c	XEPSB20P08000		Screw	AA

VIEWFINDER PARTS

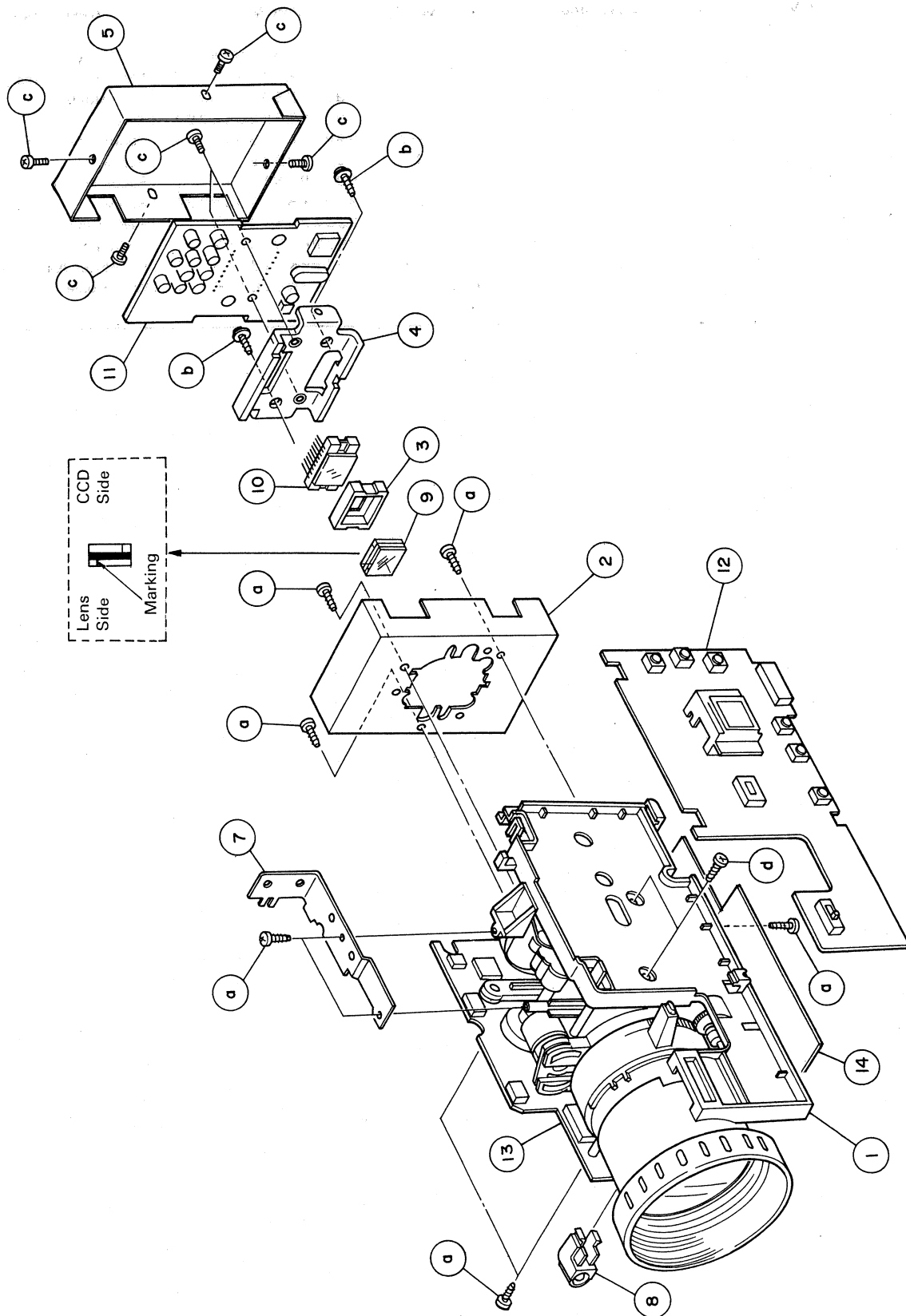


CAMERA UNIT PARTS

★ MARK: SPARE PARTS DELIVERY SECTION

Ref. No.	Part No.	★	Description	Code	Ref. No.	Part No.	★	Description	Code
1	LHLD F1022TAZZ		PWB Holder	AC	12	DUNTK2228RA00		Camera Operation Board Ass'y.	—
2	PSLDM3127TAFW		Sensor Shield	AE					
3	PCôVM8011TA00		Dust Protection Rubber	AB	13	DUNTK2226PM03		Camera Main Board Ass'y.	—
4	LANGK0267TAFW		Sensor Holder	AD					
5	PSLDM3128TAFW		Shield Case	AD	14	DUNTK2227PM00		Auto Focus Board Ass'y.	—
7	LANGT0419TAFW		V/F Holder	AB	a	XEPSD20P06000		Screw	AA
8	LHLDZ1130TAZZ		LED Holder	AC	b	LX- HZ3037GEFD		Screw	AA
9	PFiLW0055TAZZ		Crystal	AY	c	XBPSD20P04000		Screw	AA
10	VHiLZ2113// - 1		CCD Sensor	BQ	d	XEPSB20P08000		Screw	AA
11	DUNTK2262PM00		Sensor Board Ass'y.	—					

CAMERA UNIT PARTS

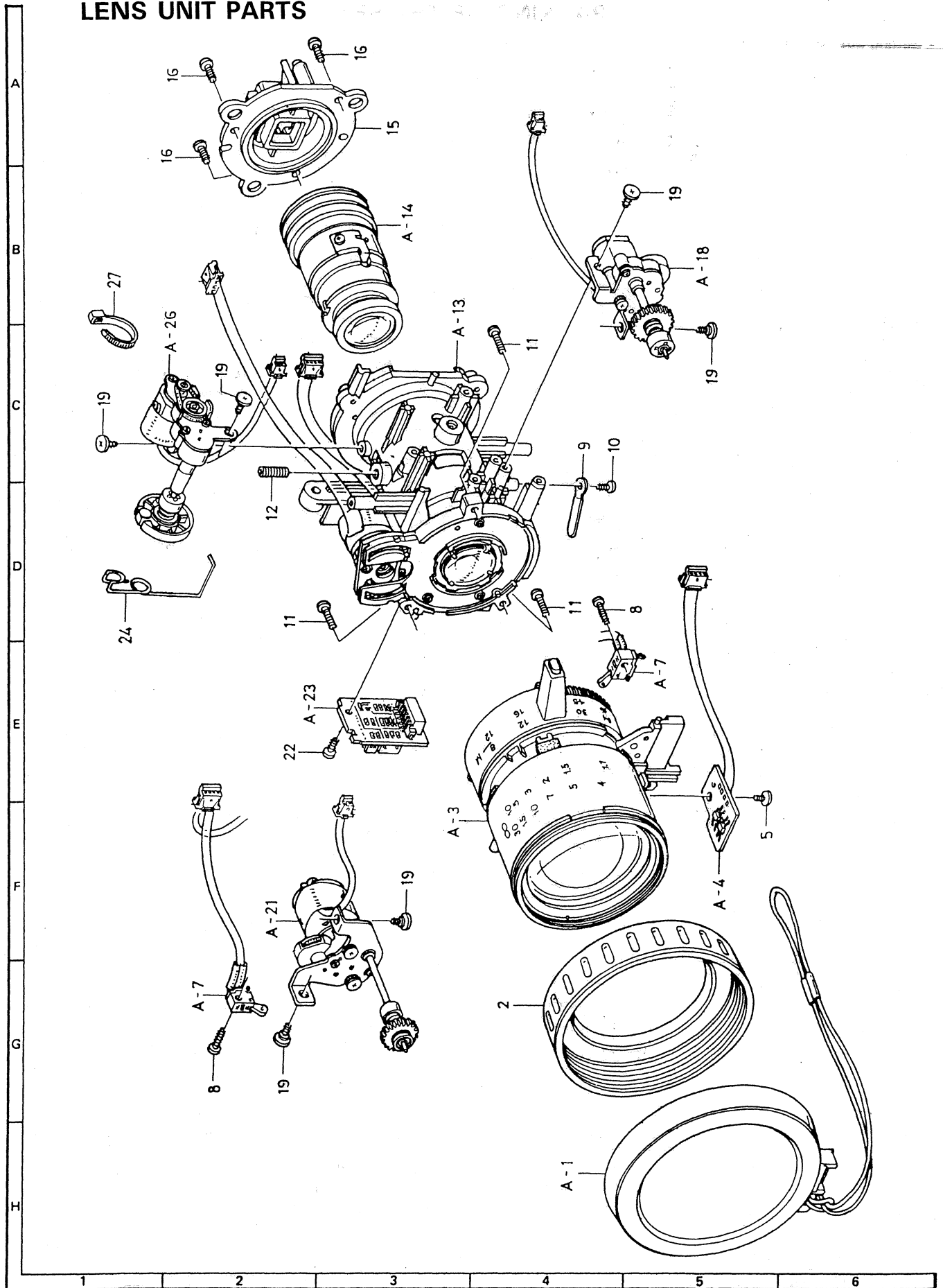


LENS UNIT PARTS

★ MARK: SPARE PARTS DELIVERY SECTION

Ref. No.	Part No.	★	Description	Code	Ref. No.	Part No.	★	Description	Code
A-1	CLNS- 0100TA06		Lens Unit	CD	A-13	99JWPK513944		Iris Ass'y.	BE
2	99JWPKB514107		Hood Cap Ass'y.	AK	A-14	99JWPK513951		Master Lens Ass'y.	BP
A-3	99JWPKB514105		Hood	AH	15	99JWPKB514108		CCD Holder	BU
A-4	99JWPKB514109		Zoom Lens Ass'y.	BU	16	99JPKBT204535		Screw	AA
5	99JWPKB514131		Sensor PWB Ass'y.	AR	A-18	99PWP513942		Zoom Motor Ass'y.	AZ
A-7	99JPKBT142540		Screw	AA	19	99J512649		Screw	AB
	99JWPK513975		Zoom Position Switch	AF	A-21	99JWPK513941		Fucus Motor Ass'y.	AY
8	99JPKBT177030		Ass'y.	AA	22	99JPKBT203535		Screw	AA
9	99JWPK513373		Screw	AC	A-23	99JWPK513973		PWB Ass'y.	AP
10	99JPKBT173030		Lug	AA	24	99JWPK513952		Switching Lever	AH
11	99JWPKP206035		Screw	AA	A-26	99JWPK513943		Ex. Motor Ass'y.	AZ
12	99JUPCA818323		S-Screw	AB	27	99JLPW816145		Wire Holder	AB

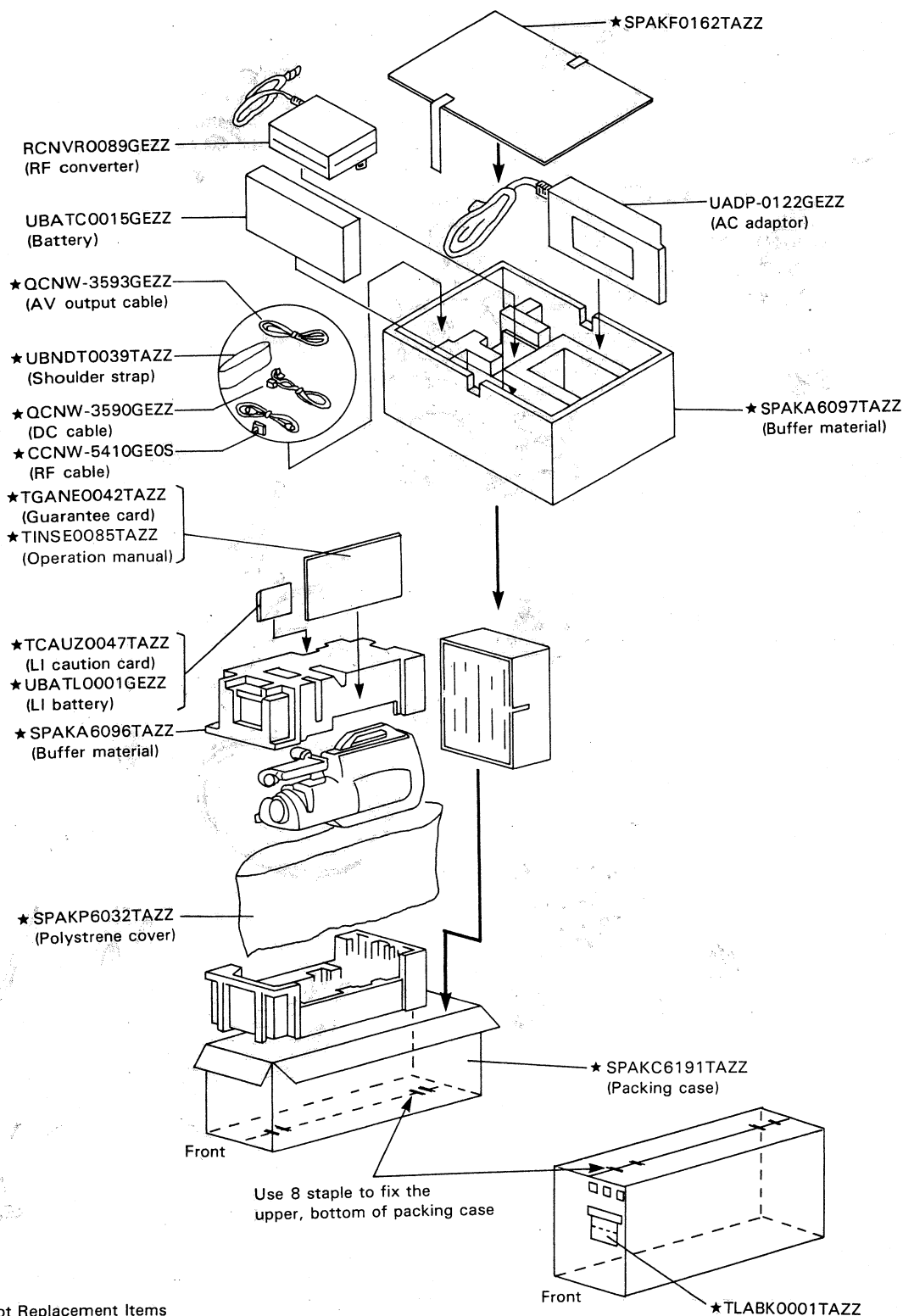
LENS UNIT PARTS



PACKING OF THE SET

• Setting positions of the Knobs

VHS CAMCORDER	Focusing Ring Position	∞
	Zoom Lever Position	Tele
	Full Auto Lock SW. Position	ON
	Edit SW. Position	OFF



AC ADAPTOR for CAMCORDER

UNIT No. UADP-0122GEZZ**Features**

- Compact and light-weight design for easier portability.
- Automatic voltage change AC 100V to AC 240V allows the adaptor usage even in your trips abroad.
- Charging function with battery pack.
- Rapid charging function to enable the charging in a shorter period of time.

Specifications

Power Requirement:	AC 100~240V, 50/60 Hz
DC Output:	DC 13V, 1.4A
Power Consumption:	30W
Dimensions (approx.):	3 ¹ / ₁₆ ''(W)x1 ²⁷ / ₃₂ ''(H)x7 ¹ / ₄ ''(D) 78(W)x47(H)x184(D) mm
Weight (approx.):	0.99 lbs (450 g)

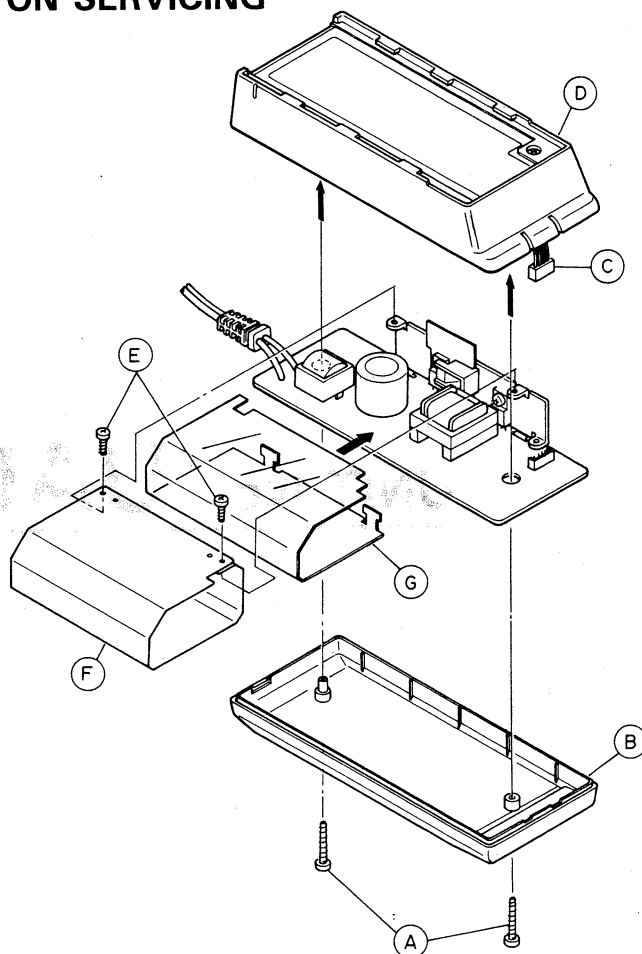
* Specifications subject to change for product improvement without notice.

PROCEDURES ON SERVICING

Servicing procedures

• Disassembly

1. Remove the two screws (A) from the bottom of the case.
Detach the lower half (B) of the case.
2. Disconnect the connectors (C) off the main PWB.
Detach the upper half (D) of the case.
3. Remove another two screws (E).
4. Finally take out the shield plate (F) and the insulating sheet (G).



OPERATION MANUAL

1. Outline

This AC adaptor consists of a separately excited switching regulator which employs control IC and a multifunctional circuit in the secondary side as shown by the block diagram in Fig. A.

The hybrid ICs used for the control section of the primary side and the multifunctional circuit of the secondary side simplify the circuit structure.

The primary function of this adaptor is to perform constant-voltage and constant-current controls by comparing them with the reference voltage kept at the secondary side. It is also equipped with a full charge detector and a timer protector. A lead acid battery is used for a battery charger. The battery can be attached or removed with one touch of a finger.

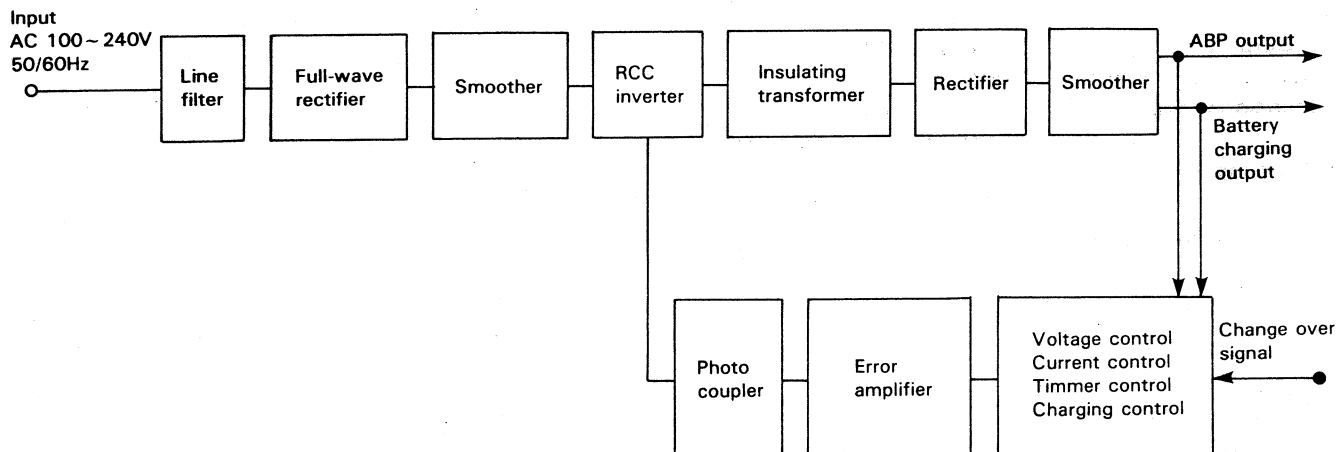


Figure A.

2. Operation

(1) Adaptor mode

When the specialized battery is not attached to the adaptor, the constant DC voltage (+13V, 1.4A) can be obtained to operate CAMCORDER.

The electricity consumed by the whole control input range is constant. This means that the operation of the adaptor is always kept stable even if input varies.

Also, its output property with more than two times as large as the rated value can withstand excessive current such as starting current and rush current.

On the other hand, the output of adaptor is exposed directly to the outside. Therefore, the overcurrent protector with intermittent oscillation, which controls the power when the short circuit from the outside occurs, is used to prevent the adaptor from being destroyed or broken down. It also prevents the temperature inside the adaptor from rising too excessively.

(2) Charge mode

This adaptor, when the specialized battery is attached, can be used as a quick charger. This charging operation is divided into operationing modes of three stages. The adaptor goes through these modes sequentially.

V-I property of each mode is shown in Fig. B.

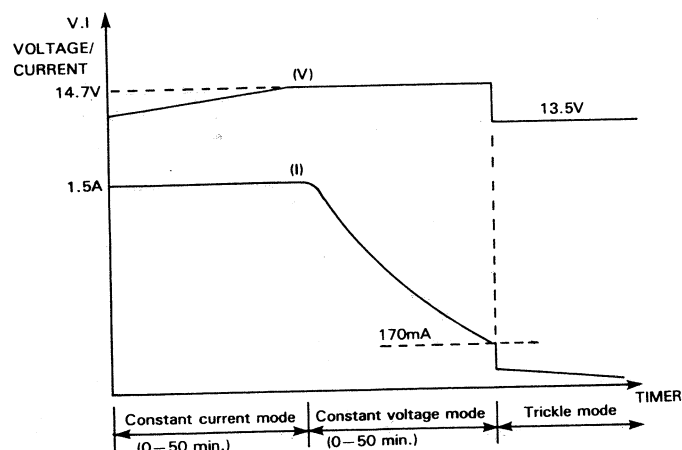


Figure 2. Voltage/Current variation in charge mode

3. Circuits

The circuits used for the adaptor are explained according to the circuit diagram.

(1) Input section

The input section consists of noise filter and rectification smoothing circuit of condenser input. The noise filter, which consists of L1, C1 and C2, reduces common noise. R1 is a resistance for discharging electricity retained at input AC plug when the power is turned off. R2 is a resistance which is required to be installed by the safety specification, but it also prevents static electricity from being generated. The amount of rush current which is caused when the power is turned on is greatly limited by R3, DC resistance of L1 and the operating resistance of D1.

(2) Switching section

The switching circuit, corresponding to the signals sent from the hybrid IC for controlling the primary side, makes FET Q1 work as a drive as a switch by using the DC voltage rectified through C3. It, together with the transformer T1, makes up a high-frequency inverter. R7 and C4 are surge absorber circuits which absorb the rectified surge voltage generated from the switching of Q1.

(3) Primary side control section

This section drives the switching section by converting the pulse duration of the signal received from the secondary side control circuit through the photo coupler. The IC for MOSFET drive is used as a control IC. This IC, operating as an overvoltage protector, contains a circuit which stops oscillating when it detects the overvoltage (approximately 18V) at D5.

(4) Output circuit section

The secondary side output, which can be controlled by a popular on-off system, reduces output ripples and common mode noise through the choking coils of L2 and L3. D11 is used to prevent discharging trouble to the control circuit section caused when the input is turned off with the battery attached.

(5) Secondary side control section

The function of the secondary control section is to control the switching section by detecting the output voltage and current and conducting the detected signals to the primary side control circuit through the photo coupler. The secondary side control section employs a hybrid IC to realize high packaging density and non-modulation, and fine adjustment of output voltage and current is performed by the trimming.

The internal operation of IC3 is explained below. First, the constant voltage is adjusted and set by comparing the divided voltage potentials (R2 and R3) of standard voltage (approximately 5.1V, DZ1) with those (R27, R4 and R5) of output voltage at the OPAMP IC1-1 (ADP mode). The output voltage in the CHG mode can be set by changing the ratio of the divided voltage potentials by turning on the SW. Q2, and that in the trickle mode can be set in the same way by turning on the SW. Q1.

ADP mode	13.0V
CHG mode	14.7V
Trickle mode	13.6V

OP AMP IC1-2, like IC1-1, sets the constant current value by using the divided resistance potentials. The SW. Q7 is used to shut off the constant current of 1.5A when the adapter is in the ADP mode. The constant current of approximately 3A is sent in the ADP mode.

The comparator IC2-1 establishes the time for preventing troubles such as chattering caused by the attachment of the battery and for activating the overcharged battery through the initial timer. About five minutes are provided for this time.

The timer is made up of a simple CR. (R14, the condenser connected to ⑩ pin)

The comparator IC2-2 is an IC which determines the current value for detecting trickles. This value can be set by the ratio of divided voltage potentials of the standard voltage and the ratio of divided applied voltage potentials of R9, the resistance for detecting electric current. The setting value is approximately 170mA.

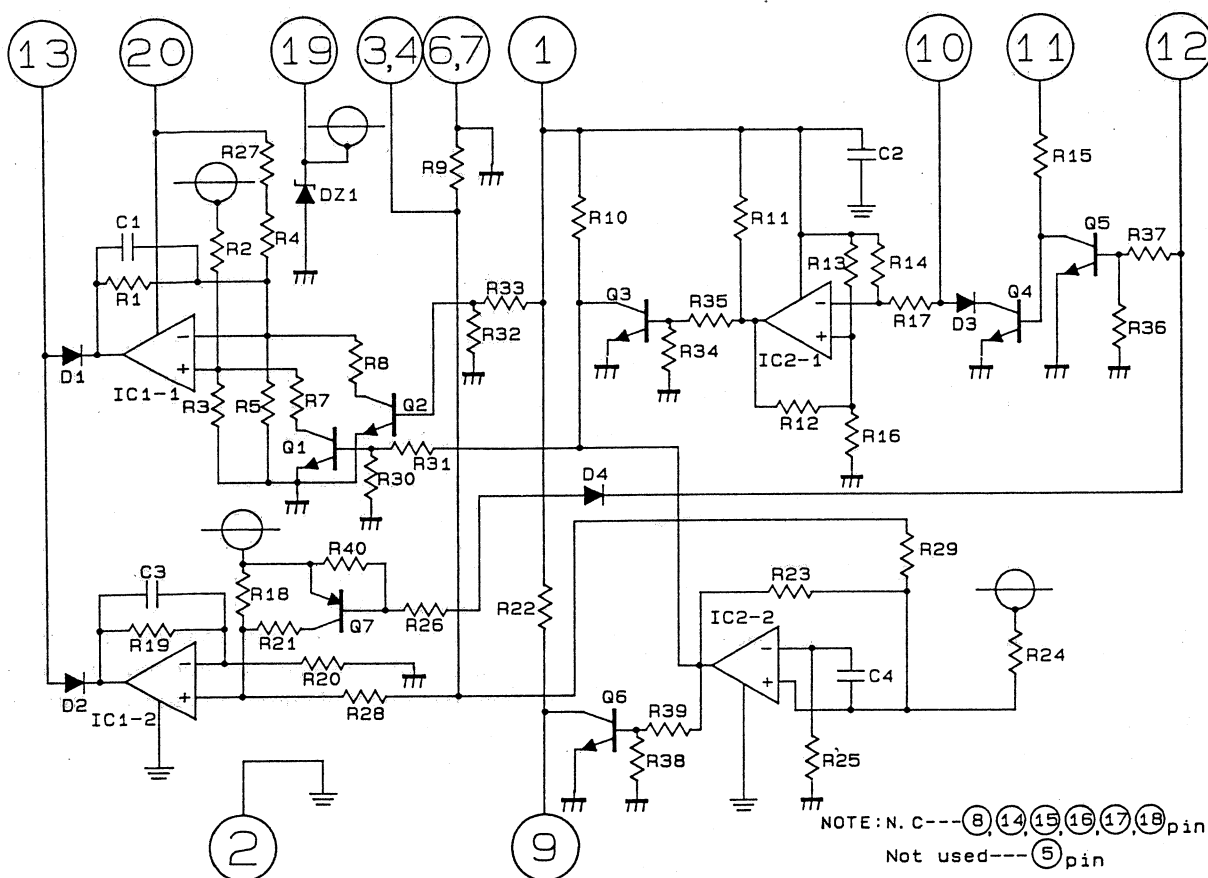


Figure C. Circuit in IC3

(6) Battery detector

With the battery removed, the input voltage of the comparator IC2 is $V_+ < V_-$ and the output of IC2 is in the low state.

When the battery is attached, voltage drop is caused by the resistance R26. Then, voltage becomes $V_+ < V_-$, and the output of IC2 is put in the high stage. When the output becomes high state, Q3, and then Q2 are turned on and Vcc is supplied into ① pin of IC3.

When Vcc is supplied, Q2 (IC3) is turned on, and R8 is connected to R5 (IC3) in parallel. The output voltage (Vout) of the adapter can be calculated by the following formula: $V_{out} \approx V_{REF} \left(1 + \frac{R_{27} + R_4}{R_5}\right)$ (R27 and R4 are inside the IC3).

Therefore, $R_5 \rightarrow R_5 // R_8$ can be obtained and Vout increases from 13.0V to 14.7V.

Also, when the battery is attached, the output of comparator IC2 is changed from low to high state as described above, and Q7 (inside IC3) is turned off. Then, R21 (IC3) connected to R18 (IC3) in parallel is opened. As the constant current point of the output current Iout can be calculated by the formula, $I_{out} \approx V_{REF} \cdot \frac{1}{R_9} \cdot \frac{R_{28}}{R_{18} + R_{28}}$ (R9 and R28 are inside IC3), R18 becomes $R_{18} // R_{21} \rightarrow R_{18}$, and the constant current point decreases from 3A to 1.5A. Therefore, the battery is charged by the 1.5A of electric current.

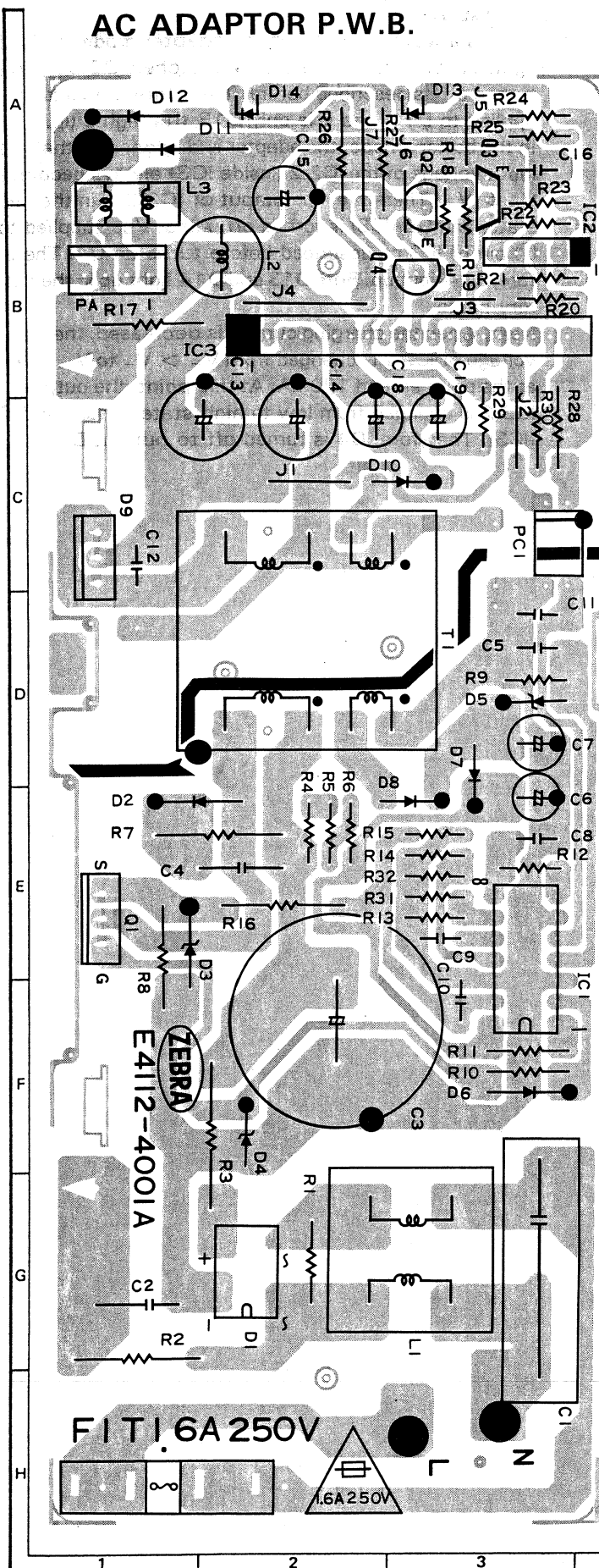
(7) Display

Vout is always outputted in the adapter mode, so D13 lights up. When the battery is not attached, Q2 is always turned off as described before. Therefore, no voltage is applied to D14, and it is only D13 that lights up.

In the battery mode, the adapter is designed so that the input voltage of the IC2-2 (inside IC3) always becomes $V_- > V_+$. Therefore, the output of IC2-2 is in the low state, and Q6 (IC3) is turned off. Also, Vcc supplied to ① pin of IC3 as described before turns on Q4. Therefore, D14 light up. Both D13 and D14 light up in the battery mode.

Next, when the charging current is decreased, the input voltage of IC2-2 is changed from $V_- > V_+$ to $V_- < V_+$ at the point around 170mA. At this point, the output of IC2-2 is changed from low to high state to turn on Q6 (IC3). Therefore, Q4 is turned off to put out D14.

AC ADAPTOR P.W.B.

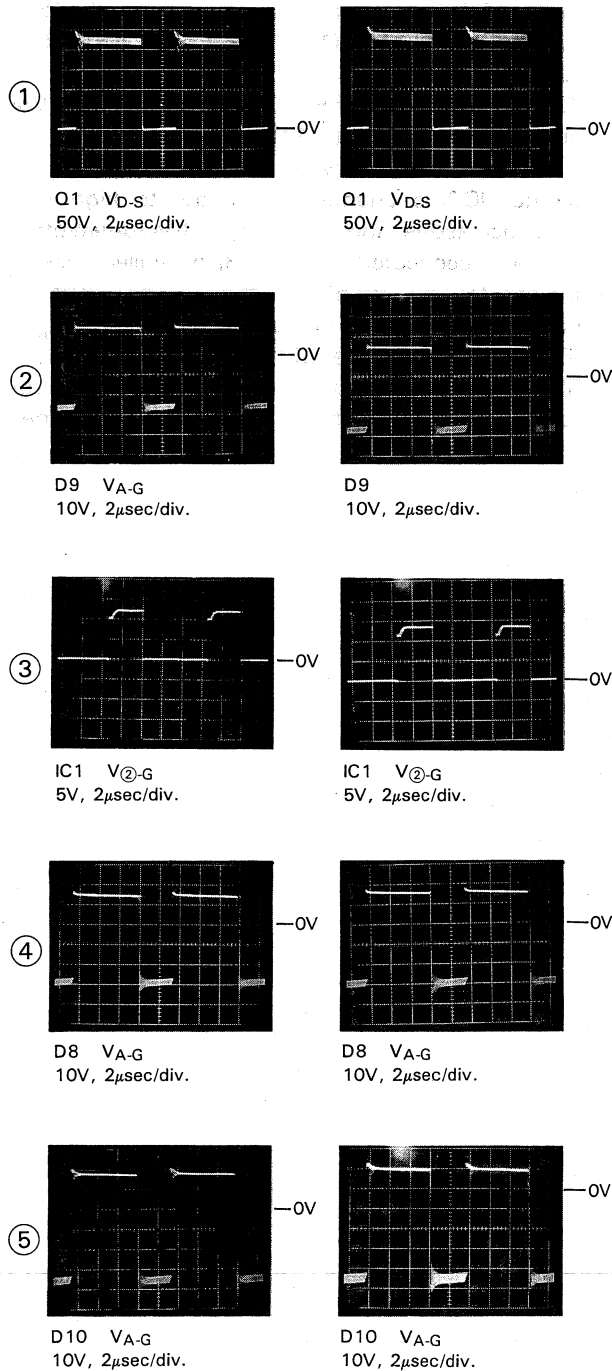


- **ADP mode**

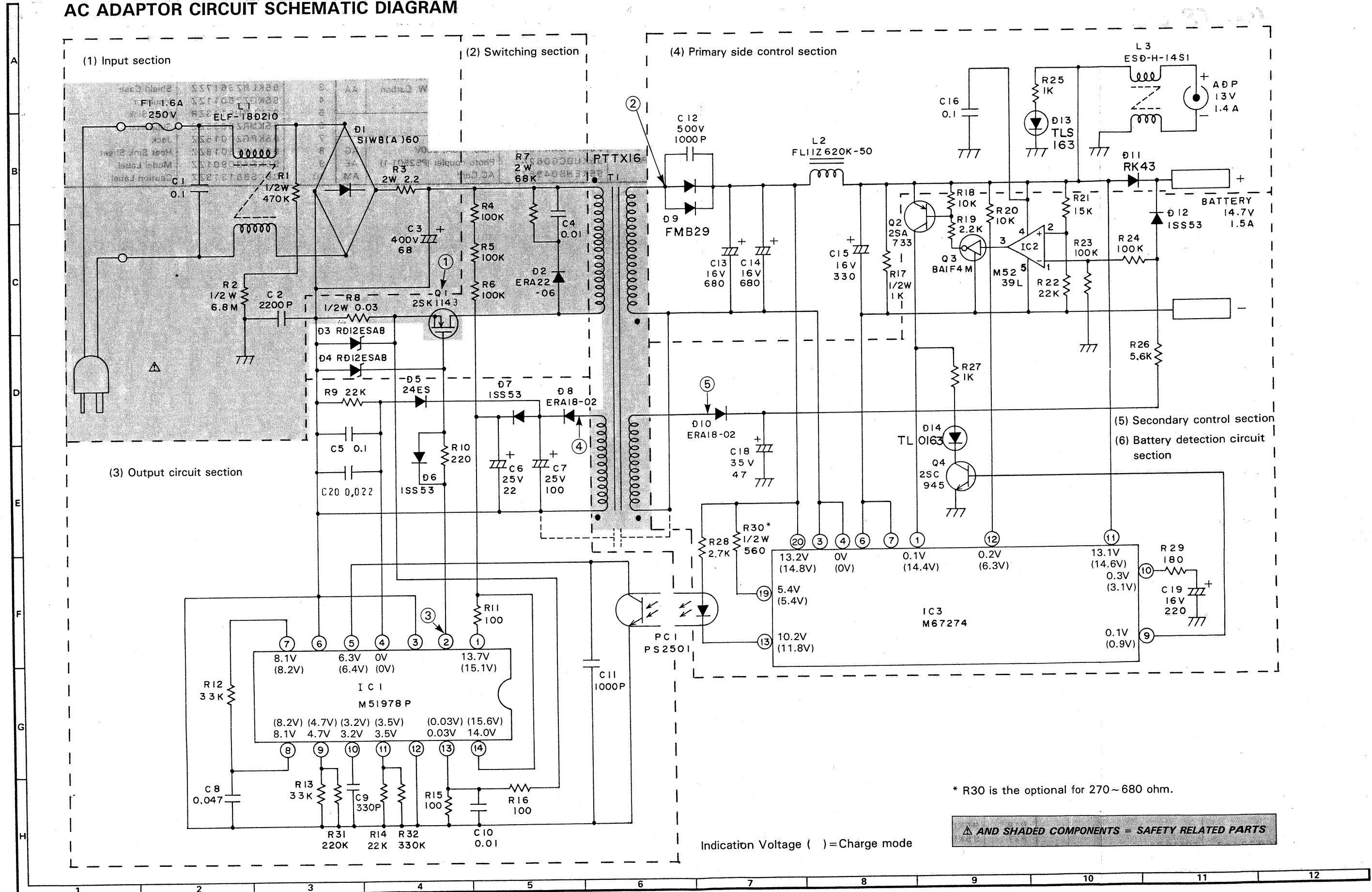
Power requirement :
AC 120V
On-load current : 1.4A

- **CHG mode**

Power requirement :
AC 120V
Charged current : 1.5A



AC ADAPTOR CIRCUIT SCHEMATIC DIAGRAM



PARTS LIST

PARTS REPLACEMENT

Many electrical and mechanical parts in video cassette recorder have special safety-related characteristics.

These characteristics are often not evident from visual inspection nor can be protection afforded by them necessarily obtained by using replacement components rated for higher voltage, wattage, etc.

Replacement parts which have special safety characteristics are identified in this manual, electrical components having such features are identified by Δ and shaded areas in the Replacement Parts Lists and Schematic Diagrams. Components marked with an (Δ) are related to X-Ray protection circuit.

The use of a substitute replacement part which does not have the same safety characteristics as the factory recommended replacement parts shown in this service manual may create shock, fire or other hazards.

"HOW TO ORDER REPLACEMENT PARTS"

To have your order filled promptly and correctly, please furnish the following informations.

1. MODEL NUMBER
2. REF. NO.
3. PART NO.
4. DESCRIPTION

Contact your nearest SHARP Parts Distributor to order.

For location of SHARP Parts Distributor,
Please call Toll-Free;
800-447-4700

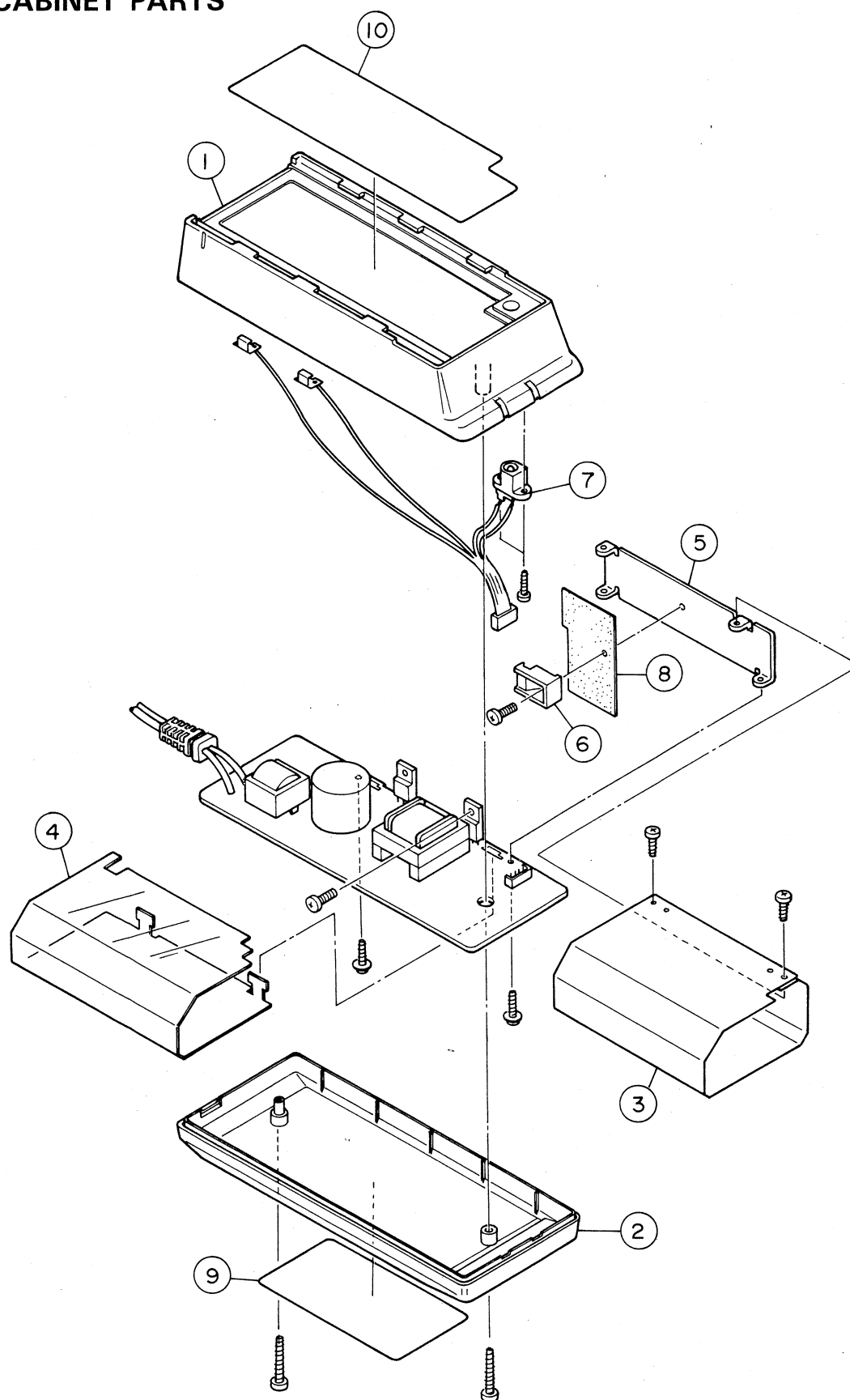
PWB ASSEMBLY IS NOT REPLACEMENT ITEM

Δ MARK: SAFETY RELATED PARTS

Ref. No.	Part No.	Description	Code
D11	95KUBC0199AZ or 95KUBB0066BT	RK43 ESAB85M-009	AE AH
D13	95KUDC0104AZ	TLS163	AC
D14	95KUDC0105AZ	TLO163	AC
COILS AND TRANSFORMER			
Δ L1	95KUKZ0118ZZ	Filter.	AM
L2	95KUKZ0301ZZ	Choke Coil	AE
L3	95KUKZ0129ZZ	Filter	AK
Δ T1	95K130035011	PTTX16	AX
CAPACITORS			
Δ C1	95KUGZ0712ZZ	0.1 μ F, Film	AE
Δ C2	95KUGCQ222AB	2200pF, Ceramic	AD
Δ C3	95KUGBQ680CD	68 μ F, 400V, Electrolytic	AN
Δ C4	95KUGCZ103AB	0.01 μ F, Ceramic	AE
C5, 16	95KUGFF104AR	0.1 μ F, Film	AC
C6	95KUGAD220DC	22 μ F, 25V, Electrolytic	AB
C7	95KUGAD101DC	100 μ F, 25V, Electrolytic	AC
C8	95KUGFF473AR	0.047 μ F, Film	AB
C9	95KUGCF331AD	330pF, Ceramic	AA
C10	95KUGFF103AR	0.01 μ F, Film	AB
C11	95KUGFF102AR	1000pF, Film	AB
C12	95KUGCZ102AD	1000pF, 500V, Ceramic	AB
C13, 14	95KUGAC681DV	680 μ F, 16V, Electrolytic	AE
C15	95KUGAC331DC	330 μ F, 16V, Electrolytic	AD
C18	95KUGAE470DC	47 μ F, 35V, Electrolytic	AE
C19	95KUGAC221JE	220 μ F, 16V, Electrolytic	AC
C20	95KUGCF223BR	0.022 μ F, Ceramic	AC
RESISTORS			
Δ R1	95KUEEC474AK	470k ohm, 1/2W, Carbon	AA
Δ R2	95KUECC685AB	6.8M ohm, 1/2W, Solid	AB
Δ R3	95KUEAE2R2AA	2.2 ohm, 2W, Metal	AD
Δ R4, Δ 5, Δ 6, 23, 24	95KUEEB104BB	100k ohm, 1/4W, Carbon	AA
Δ R7	95KUEFE683AW	68k ohm, 2W, Metal	AC
Δ R8	95KUEFCR33AP	0.03 ohm, 1/2W, Metal	AB
R9, 14, 22	95KUEEB223BB	22k ohm, 1/4W, Carbon	AA
R10	95KUEEB221BB	220 ohm, 1/4W, Carbon	AA
R11, 15, 16	95KUEEB101BB	100 ohm, 1/4W, Carbon	AA
R12, 13	95KUEEB333BB	33k ohm, 1/4W, Carbon	AA
R17	95KUEEC102AK	1k ohm, 1/2W, Carbon	AA
R18, 20	95KUEEB103BB	10k ohm, 1/4W, Carbon	AA
R19	95KUEEB222BB	2.2k ohm, 1/4W, Carbon	AA
R21	95KUEEB153BB	15k ohm, 1/4W, Carbon	AA
R25, 27	95KUEEB102BB	1k ohm, 1/4W, Carbon	AA
R26	95KUEEB562BB	5.6k ohm, 1/4W, Carbon	AA

Ref.No.	Part No.	Description	Code	Ref. No.	Part No.	Description	Code
R28	95KUEEB272BB	2.7k ohm, 1/4W, Carbon	AA	CABINET PARTS			
R29	95KUEEB181BB	180 ohm, 1/4W, Carbon	AA	1	95KMRZ5096ZZ	Upper Cabinet	AQ
R30	95KUEEC561AK	560 ohm, 1/2W, Carbon	AA	2	95KMRZ5097ZZ	Bottom Cabinet	AL
R31	95KUEEB224BB	220k ohm, 1/4W, Carbon	AA	3	95KL RZ5617ZZ	Shield Case	AF
R32	95KUEEB334BB	330k ohm, 1/4W, Carbon	AA	4	95KGZZ5011ZZ	Insulator	AG
MISCELLANEOUS				5	95KL RH5143ZR	Heat Sink	AF
Δ F1	95KPJCAK1601	Fuse, 1.6A, 250V	AG	6	95KMRZ5095ZZ	Supporter	AC
PC1	95KUDC0062AZ	Photo coupler (PS2501-1)	AE	7	95KPGZ0015ZZ	Jack	AE
Δ	95KEHS0496ZZ	AC Cord	AM	8	95KMRS5018ZZ	Heat Sink Sheet	AG
				9	95KSAB0901ZZ	Model Label	AF
				10	95KSBB1313ZZ	Caution Label	AF

CABINET PARTS



VL-L330U

SHARP

T7762-S
Printed in Japan